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THE REGIONAL AIRPORT EXPERIENCE

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TABLE OF CONTENTS

Chapter One
Introduction 1

Chapter Two
D/FW: The Second Year 4

Chapter Three
Kansas City: "Everything Up To Date" 16

Chapter Four
Dulles: An Impressive First 32

Chapter Five
Montreal: Experiment at Mirabel 54

Chapter Six
Tampa: Different and Successful 72

Chapter Seven
St. Louis: Unresolved Conflict 99

Chapter Eight
Conclusions 122

Interview Schedule 146

CHARTS, ILLUSTRATIONS, AND TABLES

Charts

Passenger Volume, Dulles International 50
Aircraft Operations, Dulles International 51
Cargo, Dulles International 52
Tampa International Airport,
Passenger Traffic 93
Politics, Technology, and the
Policy-Making Process 138A

Illustrations

Terminal Complex, Kansas City International 23
General Development and Land Use Plan,
Kansas City International 27
Aircraft Sound Exposure, Kansas City
International 28
Mirabel 1975 - Surface Transportation Network 60
Mirabel: Field Layout 62
Mirabel: Terminal Complex 65

Tables

Comparative Enplanement Data, D/FW	11
Comparative Cargo Data, D/FW	12
Aircraft Type and Number of Flights, Kansas City International	22
Projections and Total Passenger Volume, Kansas City International	24

CHAPTER ONE

Introduction

This report presents the findings of the authors from their year-long comparative study of six regional airports, at Dallas/Fort Worth, Kansas City, Washington, D. C., Montreal, Tampa, and St. Louis. Although differing importantly in design and capacity, each of these airports is regional in nature. All but two are in operation - the airport at Montreal is under construction, and plans for a new airport at St. Louis are still a matter of local and national dispute.

An initial study of the Dallas/Fort Worth Regional Airport was undertaken by two of us over two years ago. The report on that first year's study* reviewed the regional political, social, and economic context in which the airport was planned, designed, constructed and opened for operations. In the past year, we have continued to monitor that airport, but have also sought to deepen our understanding through comparison with experiences elsewhere.

The concept of a regional airport may be approached in several different ways. It may be defined in terms of size, location, area served, the design group's intentions, or users' perceptions, to name but a few possibilities. We have limited our definition to that relatively small

*See James Brown and J. D. Starling, Prometheus Unbound: A Study of the Dallas/Fort Worth Regional Airport, February 1975.

class of facilities that, from the first, have been mandated by the Federal Aviation Administration to serve an entire region or "economic city". Thus the airports we are studying have been conceived as regional facilities from the outset, by designers and policy-makers alike. We approach each case as a unique historical entity, but go on to investigate such common elements as:

- 1) the use of predictive models in planning;
- 2) the role of symbolism to heighten dramatic effect;
- 3) the roles of community and professional elites; and
- 4) design flexibility.

These elements are singled out in each case and are then further refined in a comparative theoretical chapter. We have in this way enriched our propositions developed from the Dallas/Fort Worth case and have developed more general hypotheses.

Among the more important hypotheses developed from our study thus far are the following:

- 1) Selecting the site for a regional airport tends to generate political, social and economic, as well as technical, conflicts.
- 2) Conflicts generated in the site-selection process may continue to affect the design, construction and operation of the regional airport.
- 3) Resolutions of site-selection controversies imposed by extra-regional authority or reached by pre-existing regional institutions are likely to have fewer negative carry-over effects than are resolutions reached by ad hoc negotiations among regional interests.

- 4) A common route to local elites' resolution of site-selection and planning controversies is to stress the economic growth-generating promise of the new airport.
- 5) Emphasis on economic growth tends to lead the policy-makers and the design group to stress large capacity and dramatic, high-technology design.
- 6) Policy-makers and designers find that large, dramatic, high-technology designs are very costly, a realization which commonly leads to further justification and/or attempts to reduce capital outlay.
- 7) The need to explain large capital outlays is likely to be filled at the outset by projections of rapid growth.
- 8) Projections of accelerated demand tend to amplify the tendency to dramatic, high-technology designs in keeping with expectations that the facility itself will be a determinant of the predicted acceleration.
- 9) Varying experience levels among both policy-makers and designers tend to be associated with the dramatic and technical characteristics of the resultant facility.

This comparative research has enabled us to question the assumptions underlying present airport planning methods and design techniques.

It also should begin to lead us toward alternative perspectives regarding airport plans and designs.

In the coming year, we expect to visit each regional airport once again in order further to refine this beginning, somewhat rough analysis of the highly interactive relationship between the socio-political and technical processes in the formation of large-scale, technical projects.

CHAPTER TWO

D/FW: The Second Year*

The Dallas/Fort Worth Regional Airport continues to be an important newsmaker. Through the second year of operation the facility has been plagued by technical, financial, and political difficulties. Of the many impediments that have vexed airport officials since D/FW opened, three have been particularly important in the past year.

In our investigation of D/FW we suggested that the Airtrans people mover system was a design feature intended as much for symbolic as functional purpose. We argued also that it was an expensive, technically sophisticated apparatus which was contributing to costly excess at D/FW.

We went on to say that expensive excesses resulting from investment in symbolic function led to optimistic expectations regarding revenue/cost ratios and, as a consequence, day to day finances or cash flow would be disappointing to administrators and local officials alike.

Such disappointments, we concluded, might very likely rekindle old antagonisms, and elites in Dallas and Fort Worth once again would be fueling over commercial air service to the region. Thus, predictably, in 1975 the three most newsworthy topics were disagreement and dis-

*For an analysis of the development and first year of operation at D/FW see Brown and Starling, Prometheus Unbound: A Study of the Dallas-Fort Worth Regional Airport, February 1975, NSG 2006.

appointment resulting from revenue/cost imbalances which were exacerbated by Airtrans' poor performance and Southwest Airlines providing inexpensive commercial service from Dallas' Love Field.

Current Operations, Problems and Prospects

Airtrans: poor performance, litigation, and hard feelings - the surprising costs of symbolic functions.

In our February, 1975 report, we argued that the Airtrans people mover system appeared to have been included to serve a symbolic purpose more than passenger needs (p. 59). We noted that while the Airtrans system was expected to fulfill six different internal transportation functions, only two were operating, and unreliably at that. At this writing Airtrans still carries only passengers and supplies, though somewhat more dependably than a year ago.

As a result of the gap between expectation and performance, the Airport Board would not accept Airtrans from the contractor, Ling Temco Vought, until it could reliably perform the six basic functions specified in the contract. LTV responded by shutting down the system for ten days in March of 1975, claiming that the Airport Board owed them an additional fifteen million dollars for contract amendments. LTV's original contract agreement provided thirty-four million dollars for design and construction of the basic transport system, including six functioning subsystems. The airlines, who are actually paying for

Airtrans, began pressuring the Board and LTV to get all functions operating. The airlines claimed it was costing them more than one million dollars a year above the basic cost of LTV's system to move employees, trash, food, etc., with back-up buses and trucks.

Negotiations concerning cost overruns and poor performance bumped along unevenly for several months, but in late September, 1975, talks deadlocked and Airtrans was shut down once again (see The Dallas Morning News and The Dallas Times Herald, September 30, 1975). The cities of Dallas and Fort Worth, together with eight airlines, immediately filed suit against LTV for more than 190 million dollars in damages (c.f. The Dallas Times Herald, October 1, 1975), while transit buses were chartered to move passengers among the terminals. But this service added another forty thousand dollars daily to the airport's operating costs.

A few weeks later LTV filed a counter suit claiming 740 million dollars in damages from Fort Worth, Dallas, the Airport Board, and eight major airlines. LTV charged that the defendants' actions had ". . . caused and (would) continue to cause damage to LTV's reputation in the ground transportation field and its marketing efforts of Airtrans around the world" (quoted in The Dallas Morning News, October 25, 1975).

Airport Manager, Ernest Dean, confessed that the buses replacing Airtrans were cheaper to operate, but went on to say ". . . after all, this airport was designed around that automated fixed guiderail

'people mover'" (quoted in The Dallas Times Herald, October 30, 1975). For the airport, with enormous costs invested in Airtrans, including payments on the thirty-four million dollar indebtedness, the operation of an expensive back-up system of trucks and buses generated great pressure for a negotiated settlement. After several weeks of intense bargaining, a tentative compromise was reached; but American Airlines, in a strongly worded statement, rejected the proposal, which awarded an additional seven million dollars to support LTV's cost overruns. American's board chairman rejected the plan, contending that Airtrans "remains unreliable, incomplete, and untested" (The Dallas Morning News, December 5, 1975). The American Airlines chief went on to say that there is no reasonable basis for paying another seven million to LTV. The following day, however, the airport board settled with LTV for 7.87 million dollars, although four major airlines (Continental, Frontier, Eastern, and American) objected and would not endorse the agreement. Their objections were liberally sprinkled with innuendos that the settlement might breach the airlines' agreements to pay D/FW's operating costs.

In summary, one is forced to conclude that in this past year, the Airtrans system cost a great deal more money, was responsible for much bad press, further strained relationships among a variety of groups responsible to and for the airport - all this, while the airport still has but two functions of the original six, namely passengers and trash, to show for the trouble.

It is likely that LTV Aerospace Corporation, a widely known defense contractor, oversold the Airtrans technology, expecting that the airport and airline officials, like those in their Department of Defense experience, would support cost overruns without serious complaint once the airport was committed to the Airtrans transportation system. Regardless of whether LTV suspected early in the game that Airtrans could not be delivered for the original contract price, the lesson is clear that local governments and private corporations are a good deal more hesitant about supporting unexpected capital outlays than are the Department of Defense and Congress.

Lastly, the Airtrans example offers no evidence that would enable us to reject the conclusion, reached after the initial research at D/FW, that focusing efforts on symbolic purposes results in a tendency toward physical and technical excess, or that such excesses substantially increase the probability that both designers and users will expect more from the system than it can provide. Thus, disappointment, conflict, and ultimately financial difficulty are liable to result.

At the same time local officials were embroiled in conflict over the Airtrans system, they were lobbying intensely to acquire permission for the British Concorde to begin scheduled operations from D/FW. Congress concluded that we didn't need an SST, and FAA officials are reluctant because the Concorde is noisy and does not meet FAA requirements for fuel reserve. Still, the Manager of D/FW, the Mayors of Dallas and

Fort Worth, and the Governor of Texas, among others, tried to work out an agreement with the British and French. They traveled to Washington to intervene with the FAA and the Department of Transportation personally, and filled the local press with the virtues and promise of flying the SST from D/FW.

The Airport Manager argued that "this airport was designed to handle supersonic planes" (quoted in The Dallas Times Herald, September 22, 1975). Moreover, the mayors of the mid-cities communities closest to D/FW actively supported attempts to attract the SST, while many in their communities have been publicly complaining about already existing noise levels at D/FW. These mayors contended that in their communities noise was indeed a problem, but they did not believe the SST would add substantially to it (c.f. The Dallas Morning News, January 18, 1976).

We are not suggesting that investing in symbolism is wrong; in fact, it seems to be necessary for enlisting citizens' support of expensive public projects. It appears, however, that there are overriding costs involved when symbolic purposes are exchanged for economies or user needs, and these costs, direct and indirect, can become part of an increasing or reinforcing spiral if they are not acknowledged and discounted in the design. We will continue with discussion of some discounting methods in the concluding chapter.

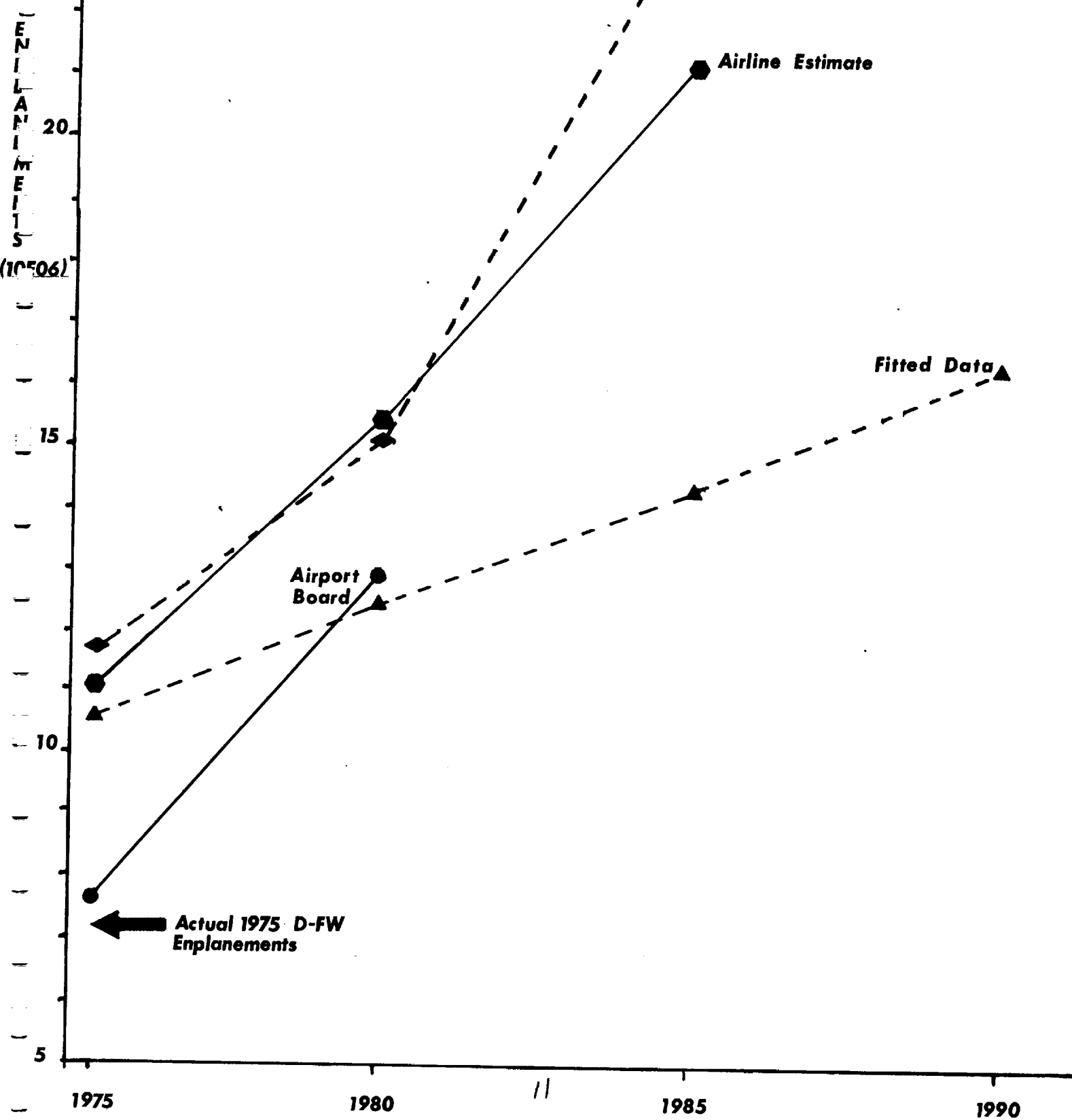
Finances: "It was a tough year but we survived."

After losing a reported 3.5 million dollars in their first year of

operation, the Airport Board and local officials have remained ominously quiet about D/FW's revenue/expenditure situation in the past year (reported by Dallas Mayor Wes Wise in a Newsroom interview March 21, 1974). Over the past two years Airtrans, the baggage handling systems, and the parking lots have generated less revenue or cost considerably more than had been projected. Moreover, we are just beginning to recover from the worst economic recession in more than thirty years, and the commercial air industry was among those hit hardest as fuel prices and utility costs jumped and people traveled less for business or pleasure. The tables below clearly indicate that the actual operating indicators for 1975 at D/FW are well below the most conservative projections.

The international air routes, which spokesmen had indicated are crucial for financial stability at D/FW, still have not materialized as expected (c.f. our Final Report, February, 1975, pp. 48-50). To date, only Air Canada has been added to the international route structure available from D/FW. Moreover, the landing fees, by which the airlines were to subsidize operating costs at D/FW, soared during the past year. When D/FW opened the fee was \$.65 per 1,000 pounds, which is considered high; the comparable cost in the Washington area, for example, is about \$.35 per 1,000 pounds. Last year the rate at D/FW climbed to \$1.05 per 1,000 pounds. Though it has receded somewhat in recent months because of increased air traffic in the wake of economic recovery, it remains

COMPARATIVE ENPLANEMENT DATA



COMPARATIVE CARGO DATA

**CARGO
TONS
(E04)**

35

25

15

10

1975

1980

1985

1990

Institute

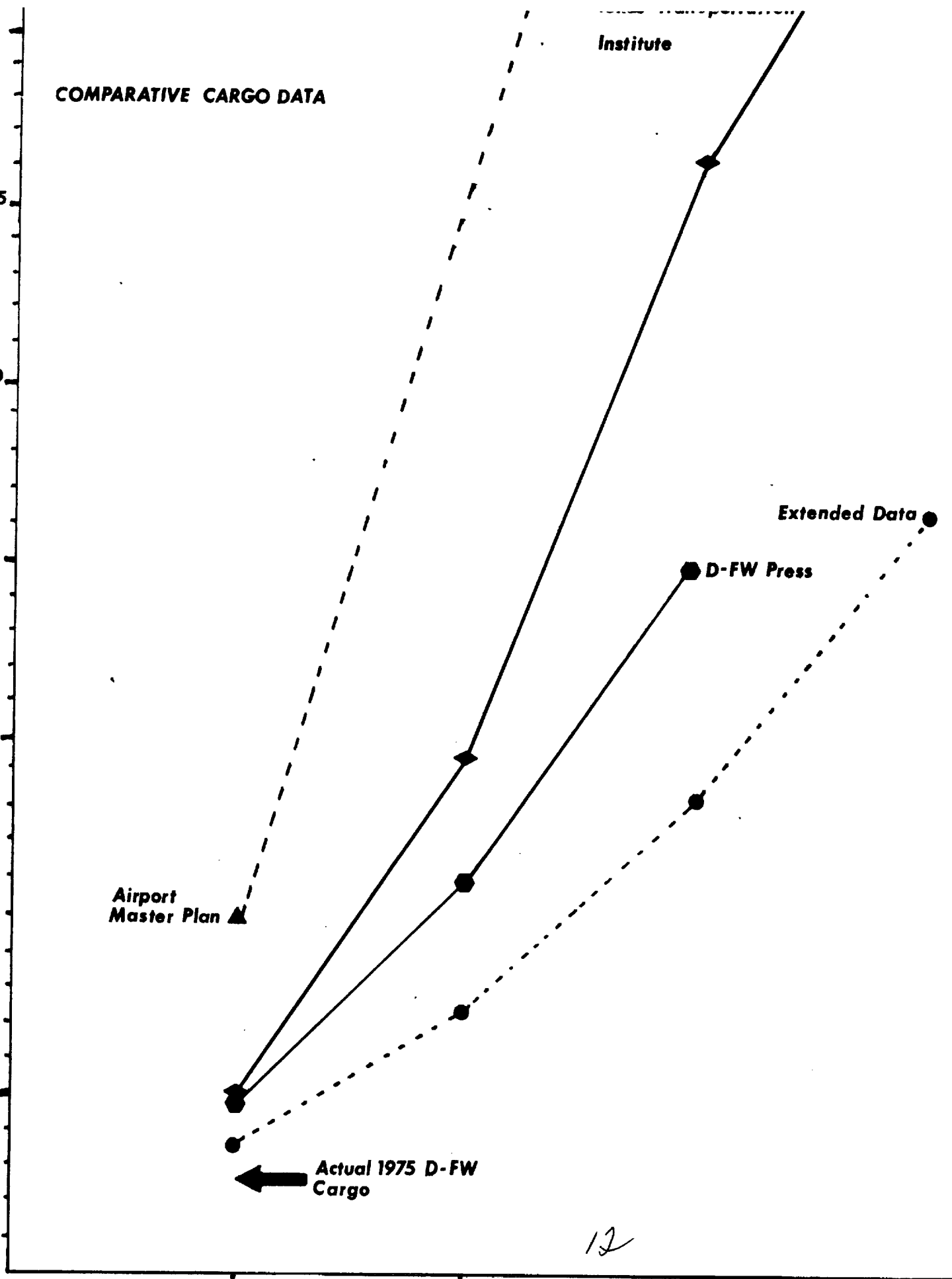
Extended Data

D-FW Press

**Airport
Master Plan**

**Actual 1975 D-FW
Cargo**

12



close to \$1.00 per 1,000 pounds.

In view of this evidence, we believe that financially D/FW is running very close to the edge. Continued trepidation about Texas' intra-state airline, Southwest Airlines, currently operating from Love Field in Dallas, also suggests that local officials feel that D/FW is financially vulnerable.

Love Field: "The politics of Love is reminiscent of the 'Old Feud'"

The skirmishing continues unabated between the leadership of Dallas and Fort Worth, the D/FW-based airlines, and Southwest Airlines at Dallas' Love Field. Activities at Love Field have generally prospered, notwithstanding the recession. In general aviation, Love Field has risen from forty-eighth to the eleventh busiest field in the nation. Southwest Airlines has doubled in size from two to four aircraft and reported a fifty percent increase in passenger volume. A family entertainment center was developed in a portion of the unused terminal building and has prospered. In fact, Love still employs about one-half as many persons as when all the airlines were housed there. Furthermore, the airport is on schedule in its efforts to repay its remaining 8.2 million dollar bonded indebtedness (c.f. The Dallas Times Herald, July 14, 1975, and The Dallas Morning News, July 13, 1975).

To date, Southwest Airlines, Love Field, and the City of Dallas have been the winners in these skirmishes, in which the airlines and

the Fort Worth civic leaders have endeavored to have Love Field closed to all air traffic. Southwest Airlines drew fire last year when it received permission from the Texas Aeronautics Commission (TAC) to increase its route structure to include the Rio Grande Valley, which is a growing center for tourism and agri-business. Recently Southwest again petitioned the TAC to expand their Dallas-Houston-San Antonio-Harlingen routes to include Austin, Corpus Christi, Midland-Odessa, Lubbock and El Paso (c.f. The Dallas Morning News, March 25 and 26, 1976, and The Dallas Times Herald, March 28, 1976). The CAB-regulated interstate airlines with extensive routes in Texas that operate out of D/FW are vociferously opposed to Southwest's petition. The Mayor of Fort Worth threatened legal action against Love Field if the additional routes are approved. He stated that ". . . the additional service would have a toppling domino effect which would destroy the financial stability of Dallas-Fort Worth Airport." ". . . I would urge our council to authorize a suit against the City of Dallas seeking to close Love Field and protect the regional airport from unfair competition" (The Dallas Morning News, March 26, 1976).

The evidence continues to indicate that D/FW is in difficult financial circumstances, a situation rendered no less difficult by the long-standing antagonisms surfacing again and again between the parties

to the cooperative venture.* For example, SURTRAN, the transportation system created by the cities of Dallas and Fort Worth, is losing money overall. The Fort Worth routes account for most of the loss. Fort Worth schedules and personnel have been reduced to cut operating costs, but deficits continue. The cities and the SURTRAN Board agree, in principle, to retain a consultant to perform a cost analysis and provide a means of getting the ground transportation system operating in the black. Fort Worth has formally approved this plan, but Dallas' City Council is hesitating because it feels that Fort Worth is the primary contributor to the operating deficits and as such, should pay the greater portion of the consultant's fee.

Our point, simply stated, is that a cooperative venture, hobbled by frequent disagreements, is not the best environment imaginable for developing creative solutions to the tough problems facing D/FW.

*Former Dallas Mayor J. Erik Jonsson resigned as Chairman of the Airport Board last January. The Fort Worth delegation felt that a Fort Worth delegate should be named Chairman and that Dallas had agreed, informally, to rotate the post. Dallas representatives, however, conceded no such understanding and used their greater number on the Board to elect a man of their choice (c.f. The Dallas Morning News, January 20, 1976).

CHAPTER THREE

Kansas City: "Everything Up to Date"

Kansas City International Airport (KCI) is, of the six airports we investigated, most like D/FW in physical design and local elite's expectations for the project. As a result, it has many of the strengths and some of the difficulties displayed by D/FW.

Both were to serve as symbols of modernity promising bright futures to all who passed through their gates. The citizens of the Kansas City area, like those in Dallas/Fort Worth, are discovering that investment in symbolic function can be expensive. The harvest reaped includes design-based impediments to smooth passenger air to ground to air transfer, disappointing inability to perceive expected economic impacts, insufficient revenue and general bewilderment that optimistic expectations are not materializing.

This is not to say that the history, design, or operation of KCI is precisely analogous to that of D/FW. The airport at Kansas City did not develop in an atmosphere of uneasy agreement built from conflict resolution. We found no evidence of serious disagreement among citizen groups, news media, elected leaders, administrative officials, and the design team. An experienced group designed and constructed KCI; Burns and McDonnell Engineers, who had been responsible for the construction at Dulles, also built the airport at Kansas City. Moreover, we did not

find that KCI, though the most like D/FW of the facilities we studied, was as technically intense or had as much excess capacity. Thus, KCI is not so dramatic as D/FW and drama is important if the symbolic function is to be effective. But then, KCI has been less troublesome and costly to operate. There is no indication that passengers have been seriously inconvenienced or that the airport's operation has been completely hobbled by technical or design-related difficulties.

Our point is that, though KCI is experiencing development pains much like those being encountered by D/FW, the difficulties have not been as intense for the Kansas City facility because of what seem to be slight technical and design differences. Thus, KCI has accumulated a four million dollar operating deficit in three years, while D/FW lost three and a half million dollars in its first year alone.

Kansas City International Airport is Kansas City's answer to air transportation needs in the last third of this century. When it opened in November of 1972, after several costly and delaying labor disputes, the City, the airlines and the federal government had invested over 250 million dollars in this facility.¹ At the time the green light

¹ Phase I consists of three terminal modules, one north-south runway (10,800 feet), one east-west runway (9,500 feet), and support facilities normally associated with large hub airports. Phase II will provide a fourth module and a third parallel 10,800 foot runway. Phase III will add a fourth north-south runway extendable to 15,100 feet, plus additional terminal and cargo facilities. Both Phase II (early 1980's) and Phase III (1992) implementation have been postponed for the dates scheduled.

was given for KCI, it appeared that the air traffic problem had reached crisis proportions. According to an article in the Kansas City Star, "The skies are crowded - even heavily congested in the larger metropolitan centers - and conditions are getting worse. . . . But a situation that can be controlled now would probably be running wild in another five to ten years" (Kansas City Star, October 9, 1966). A confidential report prepared for the city council states that "Kansas City must place highest priority on obtaining the rapid and orderly development of KCI to insure the future role of the city against possible stagnation and deterioration as a place to live and work" (Potential Role of KCI Airport, by Hammer, Greene, Siler Associates, February, 1970, p. iii). Harding Lawrence, President of Braniff International, speaking before the Rotary Club of Kansas City said, "There is no doubt that Kansas City will become a new international gateway to the world's major cities" (Kansas City Star, November 17, 1966).

Site Selection

Most of the land for KCI, about 4,600 acres, was originally purchased by the City in 1953-1954. Later purchases increased the airport area to its present size - 5,000 acres.² The airport is located in Platte County some nineteen miles northwest of downtown Kansas City.

2

The original price per acre was \$350.00. Land in this area is selling now for \$4,000.00 per acre.

The devastating flood of 1951 demolished TWA's overhaul facilities in Fairfax, Kansas (across the river from Kansas City, Missouri). At that time, the present site was selected; a runway and support facilities were built in order to insure that TWA would remain in the Kansas City area.

It was not until 1963, however, that the City was forced to decide whether a new airport would be built for the area. In that year the FAA indicated to the City that no more funding would be provided for the Municipal Airport (located one mile from downtown area). The Regional Director of the FAA, John Beardslee, described Municipal Airport as

. . . one of the poorest major airports in the country for large jet aircraft. It has the highest weather and aircraft load minimums of any fully-equipped airport in the region. No matter how our landing aids are improved, these weather minimums cannot be lowered. . . It seems to us to be only a matter of time until the new airplanes just will not fit into Municipal (Kansas City Star, August 28, 1963).

In response to Beardslee's comments, Ilus Davis, the Mayor of Kansas City, stated:

Since you have spoken, I have changed my mind completely about the urgency of developing Mid-Continent (KCI). I think we have a public responsibility to use Mid-Continent (Kansas City Star, August 28, 1963).

Although two additional sites were considered,³ the present site

3

The other sites considered were in the river bottom, five miles from the downtown area, and in Jackson County, southeast of the city.

was in the most favored position because the land had already been acquired and TWA had located its major overhaul facilities in the area. It was not until 1966, after concept studies were conducted by Burns and McDonnell and with the advent of the wide-body Boeing 747's, that the decision was made to issue 150 million dollars in non-taxable reserve bonds to support the construction effort. The airlines were to repay the bond issue out of rentals and landing fees. The voters of Kansas City approved the bond issue by an overwhelming margin (for: 57,897; against: 2,339). Referring to this victory, Mayor Davis said, "They seized the vision of the future. They did it, no one else" (Kansas City Star, December 14, 1966). As evidenced by the vote and the strong leadership of Mayor Davis,⁴ very little opposition was voiced against KCI. The airlines, primarily TWA and Braniff,⁵ supported Mayor Davis. According to our interviewees, it was Davis who was the prime mover behind KCI, while TWA was mainly responsible for the ultimate design concept that was accepted for the airport.

Planning, Design and Construction

In all, eight concept/designs were considered.⁶ Very close attention

⁴ Mayor Ilus Davis served as mayor for eight years and a total of fifteen years on the City Council.

⁵ TWA generates about forty-five percent of the air activity at KCI. Braniff International's share is about twenty-five to thirty percent.

⁶ For a detailed discussion of these designs see Mid-Continent International Airport Report on Concept Design, Burns and McDonnell, Kivett and Myers, August 27, 1965.

was paid to both the Dulles and Tampa designs. The Dulles design was not adopted because the passenger transfer vehicles were too costly and there was an ever-present possibility of drivers going on strike. Furthermore, the design was not acceptable to TWA for the same reasons. The Tampa design was rejected because it appeared to the airlines to be little more than an automated version of Dulles. The Burns and McDonnell report states:

The airlines. . . have specifically stated that Concept 3 (Dulles) would be unacceptable because of operational problems and the use of the mechanical device between terminals and the aircraft. It has been indicated that this same position is applicable to Concept 4 (Tampa).

Another factor that was considered and ultimately led to the choice of the present design is that Kansas City had very few transfer passengers - only eight percent of their total passengers. This statistic, according to our interviewees, together with TWA's insistence on direct access to the gate in order to maintain its public relations image of the moment, led to the present choice.

"The world's shortest walk to fly", and the "Drive to your gate" concepts are public relations phrases adopted to describe KCI. According to Burns and McDonnell, "This concept produces the capability of delivering the passengers virtually to the door of the aircraft." "In its purest form each gate could become essentially a terminal in itself, with complete decentralization." A passenger's walking distance is about seventy-five feet from curbside dropoff and check-in to the aircraft loading ramp (see

Illustration I for complete details).

The design of each terminal building is fairly flexible. Each terminal has three levels: baggage on the air side, passenger, and mezzanine levels. On the apron side it is possible to eventually add fingers for further gates. This is not imminently anticipated; in both the Braniff and Continental terminals there are several gates that are not presently in use.

Ironically, one of the factors that sold local officials on the need to build KCI was the advent of the Boeing 747's. However, the present configuration of each terminal module is such that passengers and baggage on 747's cannot be processed. In fact, the interior design of the terminals requires that passengers spill over into the aisle of the terminal, thus making it virtually impossible for others to move from point to point within each terminal.

Though it was constructed to meet the needs of the jumbo jet era, in 1975 the daily breakdown by aircraft for KCI was as follows:

<u>TYPE OF AIRCRAFT</u>	<u>NUMBERS</u>
747	130
DC-9	33
580	33
FH	17
707	12
737	10
L1011	2

As one can readily see, KCI is used by approximately as many small to medium size aircraft as jumbo jets and, considering the problems

TERMINAL COMPLEX KANSAS CITY INTERNATIONAL

LEGEND

- ▲ EMPLOYEE BUS STOP
- LIMOUSINE PICK UP
- △ PARK & RIDE BUS STOP
- INTERTERMINAL BUS STOP

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

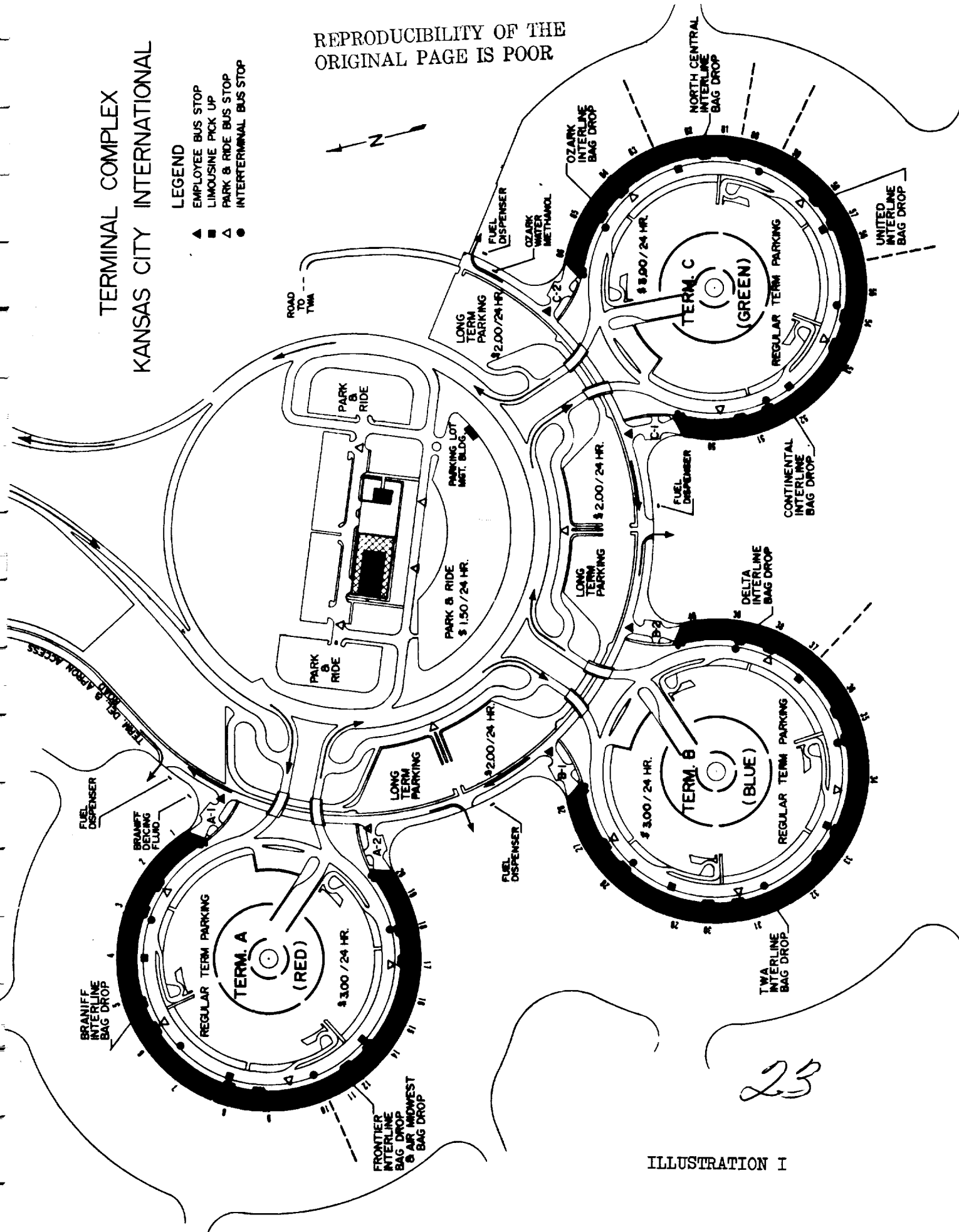
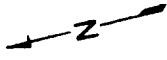


ILLUSTRATION I

associated with large numbers of passengers in the KCI terminal, it is fortunate that nearly one half of the service is provided by smaller aircraft.

Another major problem of the airport design is inter-terminal transportation for transfer passengers. The Westinghouse people mover system (comparable to Airtrans at D/FW) was examined but rejected by the airlines because they felt it was too costly. Inter-terminal transportation is currently provided by buses which charge twenty-five cents per passenger.

Economic Expectations

Projections of total passenger volume were based on the unusually high growth rate in the sixties, and an anticipation of even higher growth rates in the decades to follow. Notice the steep ascent of the curve from 1980 to 1990.

<u>PROJECTIONS (IN MILLIONS)</u>		<u>ACTUAL</u>
1972	4,150,000	3,800,000
1974	4,750,000	4,075,398
1975	5,600,000	4,460,000
1980	6,400,000	--
1990	19,000,000	--

These projected activity levels were supported by two basic arguments: (1) the anticipated growth of the national market in air traffic, of which KCI will capture a larger share due to saturation at Chicago and St. Louis; and (2) the continued growth of the regional economy and

the regional center functions of Kansas City (Potential Role of KCI Airport, op. cit., p. 17).

It was anticipated that the development of KCI would have widespread effect on the economy of the Kansas City Metropolitan Region (KCMR). "It can be expected that many new economic activities will result from this development, including new basic industries directly related to air transportation and aircraft operations, and also new industries that seek a location near major airports, even though not directly related to the airport" (Ibid., p. 17). Thus far, this has not been the case. Major population shifts have occurred to the south (Johnson County) and to the southeast (Cass County) of the metropolitan area. In fact, Wyandotte County (Kansas City) lost population during the 1960-1973 period (Statistical Observations on Population Growth Trends Within the Kansas City Metropolitan Region, April, 1975, Kansas City Development Department). KCI was intended to serve as an economic and developmental accelerator. Other projects that have been undertaken for the KCMR since the initiation of KCI are downtown urban renewal, construction of a Convention Center Complex (the 1976 Republican Convention will be held there), and the Kansas City, Kansas Renewal Program. All of these projects envisioned that the KCMR had "reached a threshold size and momentum required for accelerated growth in the foreseeable future" (Potential Role of KCI, op. cit., p. 22). It is estimated that this

revitalization plan will cost about 5.4 billion dollars, of which seventy-five percent is being underwritten by Kansas City businessmen (The New York Times, July 22, 1975).

A General Planned Development District (Kansas City Ordinance No. CS-37803) has been created for the purpose of attracting an assortment of industries and residences in the area of KCI. This plan requires strict land use control zones for the overall development of the area until the year 2,000 (see Illustration II). In addition, land use policies have been established for sound-sensitive areas around KCI using the guidelines recommended by the FAA in 1972 (see Illustration III). According to Howard Willoughby, Deputy Aviation Director for KCI, very few noise complaints - no more than six - are received by the Authority on a monthly basis. This is a rural area that is not well developed, although this could change if the airport engenders construction in the area.⁷ This stagnation is partially attributable to the setting, but a further explanation may be found in the speculative land dealings that have taken place in the KCI area. We have already noted that an acre of land in this area now sells for about \$4,000, as compared to \$350 per acre for the same type of land in 1954. Naturally, such inflated land costs are not attractive to those wishing to develop in this area.







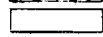


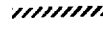

⁷ No environmental impact study was made for KCI at the outset, though one is currently pending before the FAA.

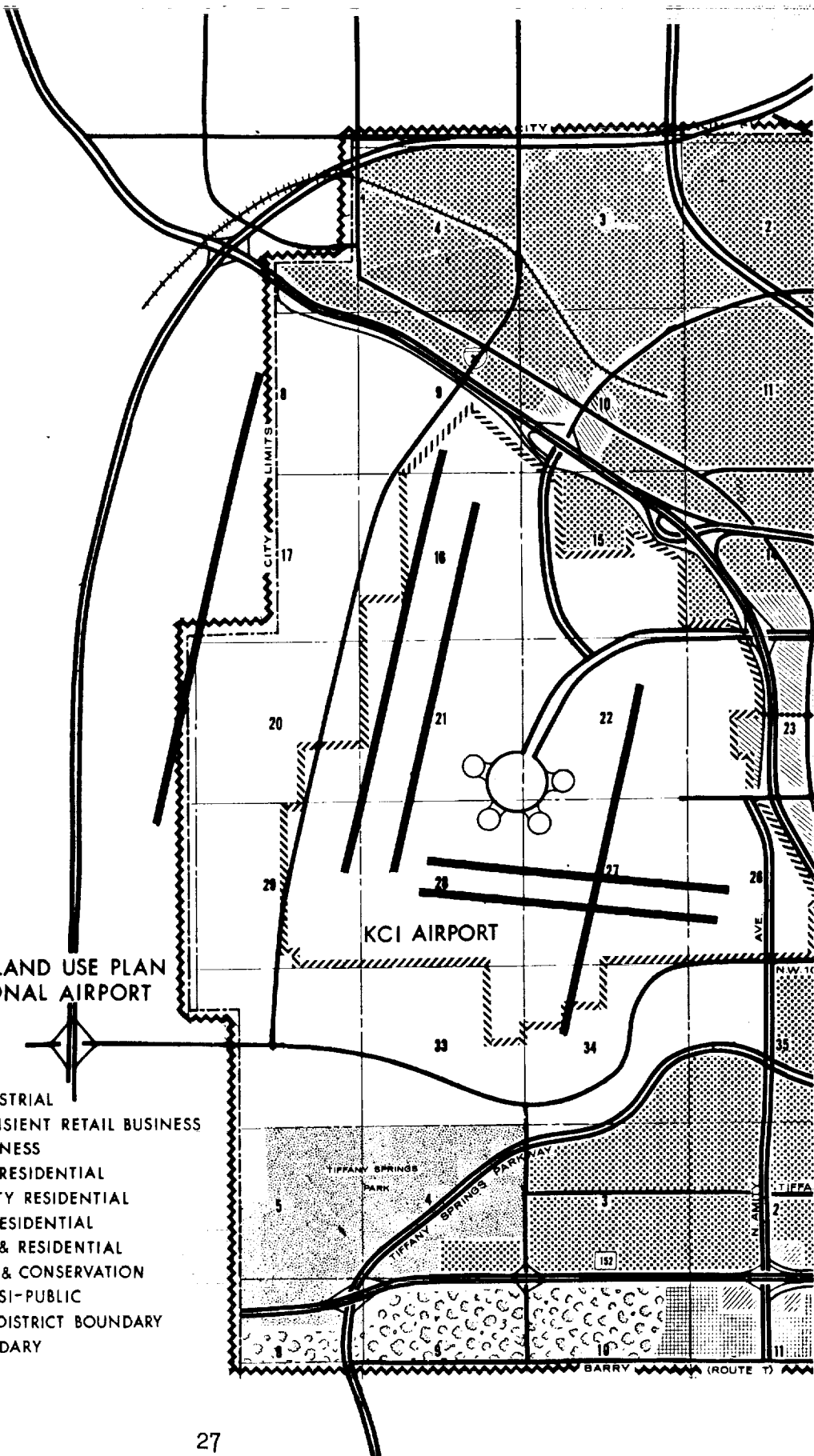
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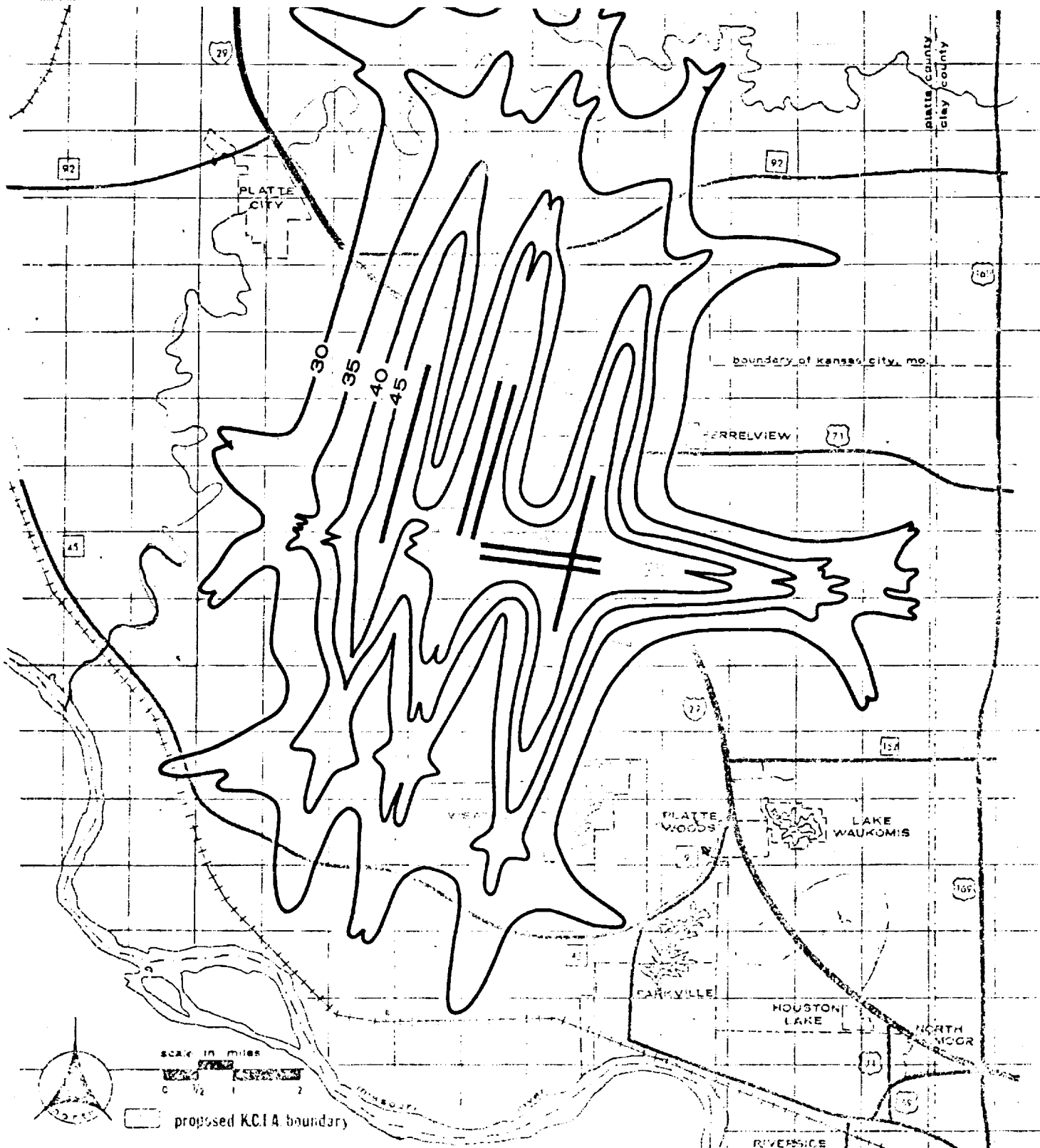
GENERAL DEVELOPMENT & LAND USE PLAN
KANSAS CITY INTERNATIONAL AIRPORT

(AMENDED)

LEGEND

-  GENERAL INDUSTRIAL
-  GENERAL TRANSIENT RETAIL BUSINESS
-  REGIONAL BUSINESS
-  HIGH DENSITY RESIDENTIAL
-  MEDIUM DENSITY RESIDENTIAL
-  LOW DENSITY RESIDENTIAL
-  AGRICULTURAL & RESIDENTIAL
-  AGRICULTURAL & CONSERVATION
-  PUBLIC & QUASI-PUBLIC
-  DEVELOPMENT DISTRICT BOUNDARY
-  AIRPORT BOUNDARY





Based upon technical data furnished by the Federal Aviation Administration.

Aircraft Sound Exposure NEF Kansas City International Airport And Environs

ILLUSTRATION III

A further contributing factor to the area's underdevelopment is its isolation from the principal marketing and employment sectors of Kansas City. There are neither rail systems nor freeways connecting the area around KCI to the Kansas City metropolitan region. In fact, this area may not begin to fully develop until highways I-435 and I-635 are completed in mid-1985 (these will be circumferential freeways around the Kansas City metropolitan area).

Most of the passengers using KCI come from the southern part of the KSMR, namely Johnson, Cass, and Jackson Counties. In a study that was conducted recently, passengers originating from this region increased in number by fourteen percent - from a total of twenty-eight percent of the trip origins in 1967 to forty-two percent in 1973 (Mid-America Regional Council, REMARC, September 2, 1973, p. 12).⁸ The initial optimism expressed for the KCI area is reflected in the construction of five new hotels, adding 1,100 rooms to the area near KCI. As of this writing only one of the five is making money, the Marriott, which is located on the airport. It is too soon to tell whether the long-range forecasts leading to such construction will be correct, but the survival

8

Passengers originating from the downtown area (including the Crown Center and Alameda Plaza) use the KCI express bus to commute to the airport. Since 1972 this service has lost money. Negotiations are presently in progress for Kansas City to purchase the KCI Express.

of these hotels is presently in jeopardy, and future development does not seem likely, according to our interviewees.

The optimistic predictions for KCI, voiced by many public officials, are still not being met, and it has now been in operation for four years. "KCI will itself be worth three hundred million dollars at 1978 prices with another three hundred million in related facilities - freeways, motels, office buildings, homes and other construction" (Kansas City Star, January 14, 1968).

Economic strife is reflected in the operation of the airport itself. At the end of 1975, four years after it opened, KCI is four million dollars in debt, which the airlines have had to underwrite. According to some of the airlines' officials interviewed, they are greatly concerned about these imbalances.

Current Operations, Problems and Prospects

Many similarities exist between the KCI experience and D/FW. Both see themselves as gateway airports of international stature, when, in fact, each has relatively few international flights.⁹ KCI was also envisioned as a growth generator for the region, supposedly encompassing an area of 700 square miles (Environmental Development and Impact Study, Runnells and Roesslin, 1970, p. 1). Kansas City International, like D/FW, has not fulfilled these expectations. In fact, in both

9

KCI has one route to Mexico City which departs and arrives once a week.

cases simplistic economic forecast models were used to justify the original proposals and sell the projects to the respective communities.

A departure from the D/FW experience can be observed in the kind of leadership and design team that was assembled for KCI. The community as a whole was quite cohesive in its desire to build it. The community leaders, especially Mayor Ilus Davis, were not fettered by controversy, and the design engineers (Burns and McDonnell) were experienced; they built Dulles International for Aaman and Whitney. This experienced group was instrumental in building a relatively less-technically intense system - as compared to D/FW, for example - to meet the needs of Kansas City citizenry.

CHAPTER FOUR

Dulles: An Impressive First

Dulles International Airport, serving the Washington, D. C. metropolitan area, has been in operation longer than any other regional airport. It was, in the words of architect Eero Saarinen, the first airport conceived and designed for commercial jet aircraft. Moreover, it may well be the most architecturally distinctive air facility in the United States. Though it has been operating nearly fifteen years, it is a remarkably modern facility.

In one respect, Dulles grew out of regional conflict; that is, local opposition near the first selected site stalled construction for seven years. But this conflict left no legacy of uneasy truce among warring interests. Unlike other airports we studied, Dulles is not the creature of local, regional, state and federal authorities. Like Mirabel at Montreal (see Chapter Five), Dulles was funded and developed by the federal government, and the Washington Airport Authority manages Dulles and Washington National for the FAA. Despite obstacles and delays, neither Congress nor the CAA (predecessor to the FAA) wavered in their determination to build a second airport for the Washington area.

Dulles was our first regional airport, rendering the question of design experience moot. Indeed, its design features are still carefully studied by designers of other major airports. The Dulles plan was adopted

for Mirabel at Montreal, and it was studied by the Dallas/Fort Worth, St. Louis, and Kansas City design teams, to name but a few.

The design of Dulles owes much to famed architect Eero Saarinen, and this was his first airport project. The design is unusually flexible, but also dramatic and technically intense. Dulles has had its share of operating problems, and revenues cannot seem to catch up to costs. Still, technical failures and design-related inadequacies have not unduly inconvenienced passengers at Dulles. In fact, except for its remoteness, it is one of the more passenger-accommodating facilities we have studied.

Costs have been a problem at Dulles as they have for all the regional airports; indeed, operating losses have been a particular problem here. But costs and losses have been less important for Dulles than for other regional airports. Dulles was very expensive to construct and use has lagged disappointingly. But Congress paid for Dulles, and though Dulles is obligated to repay these outlays from its revenues, its fate and that of the airlines or local communities does not rest on maintaining scheduled debt service to a bonded indebtedness. Still, according to all calculations, Dulles has accumulated a considerable operating deficit over the past fifteen years.

Planning, Design and Construction

The Dulles terminal is striking visually; it is dramatic archi-

ecture. The late Eero Saarinen, world famous architect, created the terminal complex and regarded it as his best work. Noted architectural critic, Ada Louise Huxtable, commenting on Dulles, wrote: "Saarinen's avowed purpose, realized beyond anyone's most optimistic hopes, was to devise a symbolic entrance to the nation" (The New York Times, April 8, 1962). Similarly, an engineer that had worked on the construction of the airport reported in an interview that there was a widely-shared commitment among those who worked on it that Dulles would be special. There is a trace of irony here in that Saarinen himself said that he carefully cast the terminal building so that its dramatic effect would be focused on the persons driving to the airport to depart, and pick up or drop passengers. The visitor actually entering the nation's capitol is treated to a somewhat squatty rear view of the terminal. So it would seem that the symbolism was not so much for the occasional visitor as for the local and frequent traveler. This should not be surprising, since the local citizens are likely to have the most visual and practical or user contact and must, in their own minds, justify the costs to the region.

It is fortunate that the federal government owns Dulles, even though much of the local citizenry is associated with the legislative and executive branches in one way or another. Some of them have important roles in certification or appropriation of monies for the airport. And, too, a regional airport imposes indirect, as well as direct costs. There is the valuable space it occupies, the added traffic, noise, some added risk

and the sometimes considerably increased strain on utilities.

Site Selection - The Burke Site; a tiny town stops the federal regional airport.

Dulles' present location near Chantilly, Virginia, about thirty miles west of Washington, was not the first site chosen for the regional airport. A Department of Commerce report, prepared in 1951 by the CAA and published in 1955, provided a summary evaluation of all the possible locations for a regional airport in the Washington area. This report concluded that Andrews Field, a few minutes southeast of Washington, was the overall best choice. Andrews was close and in use as an Air Force Base, so the cost of further development or modification would be considerably less than beginning anew. Thus, the Aeronautics Administration specialists recommended that "Congress approve a course of action leading to the construction of facilities at Andrews Field for the purpose of using it jointly as a civil/military airport" (Commerce Report, 1955, p. 1).

The report went on to name a site near Burke, Virginia as the best alternate. The Burke site was a little further out from the center of Washington than Andrews Field and it was not developed, but it was a strong second choice. In 1951 and 1952 the military did not want Andrews' military use compromised by joint development. The records subsequent to the 1951 CAA evaluation seldom mention Andrews Field as a possibility,

and then only with a passing reference to the military's need for exclusive use.

In view of the military recalcitrance with respect to Andrews, and the Department's recommendation, the Secretary of Commerce directed that right-of-way acquisition commence in the Burke area. In 1950 Congress had authorized fourteen million dollars for the construction of a regional airport in the Washington area, and the Secretary had requested slightly more than two million dollars for land acquisition. However, the Secretary had not named a specific site in this request and the Congress appropriated only one million.

In February of 1952 the Civil Aeronautics Administrator sought a supplemental appropriation for 1.6 million dollars in order to purchase more land and award contracts for engineering designs. When the request surfaced in a House Appropriations Committee hearing, strong and well-organized opposition to the proposed development at the Burke site became apparent. Congress stalled. Between 1953 and 1955 they awarded no additional appropriation, and the government withdrew the condemnation suits that had been filed in order to obtain the remaining properties necessary to construct the airport near Burke. At this point more than 1,000 acres of land had been purchased. When interviewed about the problem at Burke, none of the officials presently associated with the FAA in Washington or the Airport Authority had been in Washington during that period; but the consensus among them, based on hearsay, was that a small,

but very determined group of residents from the Burke area worked effectively through the Virginia Congressional delegation to stop action. The feeling from those now associated with the FAA in Washington and the Washington airport system was that the common concerns of noise, safety, traffic, and unsavory development motivated the opposition.

There can be no question that the opponents were determined. They were so effective that nearly four years later, when the Senate was being pressed again by the CAA to get the Burke project moving, this opposition again materialized and the appropriations were not awarded. But the Congress, too, had grown more determined in the interim. House and Senate action on the question continued until, about a year later in August of 1957, the Congress appropriated 12.5 million dollars to the Department of Commerce for development of an airport near Washington. However, Congress stipulated that the Executive must once again study the question of site and report the findings to Congress before January 15, 1958 - a matter of only four months.

Special Assistant to the President, Elwood R. Quesada - soon to be the first Administrator of the FAA - retained Greiner-Mattern, Associates to do another site study. The Greiner-Mattern group, a firm of engineers and architects, reviewed basically the same sites that had been studied seven years earlier by the CAA specialists, including Andrews and Burke.

Yet, in their summary letter to Mr. Quesada, they reported:

It is our considered opinion, based upon all technical and engineering information which has been accumulated, studied, and analyzed by our offices, that the vicinity of Chantilly, Virginia affords the site best suited for the development of an additional airport to serve the National Capitol Region (letter of December 31, 1957 to E. R. Quesada from Greiner-Mattern Associates). (Emphasis added by this writer)

Andrews and Burke were not even considered as sites in this report, while in the earlier CAA study Chantilly was thought to be a very poor third behind these two. In both studies, ground transportation time to and from downtown Washington, locations of heavy-user neighborhoods, and Washington National Airport were important criteria and carefully studied. In the CAA analysis of the Chantilly site it was concluded that "ground transportation travel time to Washington and Washington National Airport would be substantially in excess of the acceptable maximum set up in the specifications" (Commerce Report, 1955, p. 3).

Of those sites which were acceptable in other respects - geography, population density, sufficient land available, and room for approach and departure patterns - Chantilly was the most remote. In fact, the Greiner-Mattern report indicates that in 1955, 73.7 percent of the region's originating passengers would be within thirty minutes of Burke, while only 20.8 percent were within thirty minutes of Chantilly. Moreover, the projections for ground time claim that these ratios will be essentially unchanged, 71.1 and 23.0 percents respectively, through 1980.

It is then difficult for us to agree with the Greiner-Mattern claim that Chantilly, the present site, was chosen on the basis of technical criteria alone.

In May of 1958, nearly eight years after Congress authorized a second airport to serve Washington, the New York-based engineering firm of Ammann and Whitney was selected as the prime contractor for the new airport to be constructed at Chantilly, Virginia. The basic concept and the need had grown since 1950; the 4,000 acre Burke site had become 10,000 acres for Chantilly, and the fourteen million dollar project anticipated in 1950 was projected to cost fifty million in 1958. This represents about a three-fold increase in cost after correcting for inflation. When the airport opened four years later, the projected fifty million dollar cost had, by that time, grown to 110 million.

Ammann and Whitney selected architect Eero Saarinen from Michigan to design the terminal buildings and control tower, and Ellery Hulsted from Washington to serve as master planning consultant.

Field lay-out: Dulles has 11,500 foot parallel runways spaced 6,500 feet apart. There is also a third off-wind strip 10,000 feet long. Two STOL strips (one lighted), 1,500 feet in length, have also been installed. The master plan indicates that a fourth runway parallel to the cross wind may be constructed with minimum disruption, if it is needed.

VTOL/STOL at Dulles: It is likely that those responsible for choosing

and designing the airport for the Chantilly site hoped to minimize the problems raised by its remote location with an active VTOL and/or STOL schedule. The press reported that Congress was not happy about the decision to build in remote Virginia (c.f. The New York Times, January 15, 1958). When the master plan was published, shortly after the airfield opened in 1962, the design group projected a 180,000 passenger volume and 14,400 STOL operations in 1965. By 1975 they believed STOL operations would handle 770,000 passengers in 34,200 operations annually.

Inexplicably, the reality with regard to VTOL/STOL operations has diverged widely from the expectations. There has never been a helicopter operation from Dulles to other airports in the region or to central Washington. Several persons interviewed reported that they believed several companies had attempted to get approval for a take-off and landing pad near Capitol Hill, downtown, and close to the Executive Office Building. In fact, the consensus was that one such application was being considered at the time of the interview. The New York Times in June of 1967 reported that eleven of the airlines serving the capitol region asked the CAA to approve a helicopter service linking the three airports and downtown Washington. The airlines further offered to underwrite any losses the service sustained. We were not able to confirm the veracity of these rumors or the article in the Times; but the fact remains

that helicopter service between Dulles and several areas in Washington is sorely needed and has never been attempted.

There was, however, a small, one-plane STOL operation that flew between Dulles, Washington National, and Baltimore's Friendship Airport. The operation was supported by all three airports. STOL strips were installed where necessary, and special approach, departure and landing take-off procedures were developed to accommodate the needs of the operation. Several individuals reported that the Washington system airport management had great hopes for this enterprise. Everyone was reportedly quite disappointed when after a year of operating at .7 passengers per trip, the owner was bankrupt and the operation had failed.

It appears to us that the need is not so much for inter-airport STOL arrangements in the Washington area, but for STOL service in and out of the District.

Terminal: Before designing the terminal complex, Saarinen ". . . sent out teams with counters and stopwatches to see what people really do at airports, how far they walk, their interchange problems." "We analyzed special problems of jets, examined schedules, peak loads, effects of weather." "We studied baggage handling, economics, methods of operation, and so on" (from Report of Comments by Eero Saarinen about the Dulles International Terminal Building, 1961).

As a result of his studies, the architect concentrated the design around the problems of time and convenience for passengers getting to and

from the aircraft, the high cost of taxiing jet planes for long distances, and the need for flexibility in operating and servicing large jet aircraft. This led Saarinen and his associates to the conclusion that taking the passenger to the plane, rather than bringing the plane to the passenger, was the more sensible approach. This, in turn, led them to the now famous mobile lounge concept - a method of taking passengers from terminal to plane, rather than the more common alternative.

When it came to the physical design of the terminal, the mobile lounge approach enabled Saarinen to choose a single, compact building. He felt that the airport was unique in that it would be "a part of the whole complex of buildings that create the image of our nation's capitol. . . . the terminal building should express that in its architectural design" (Saarinen, Report, p. 2). Saarinen went on to say that "the tradition of federal architecture is static, but a jet airport should be essentially non-static, expressing the movement and the excitement of travel. We thought that if we could bring these two things together into a unified design, we would have a very interesting building" (Saarinen, Report, p. 2).

There is no question but that the soaring terminal building offers a dramatic exterior facade. But what of the interior where users spend most of their time? Saarinen said that the ". . . interior should convey the same special and distinctive character we tried to give the architecture itself." "Instead of the honky-tonk, Klondike-like chaos of

commercial space in most airports, all the interiors and commercial space should be thoughtfully organized to be dignified and attractive" (Saarinen, Report, p. 3).

It is our opinion that Saarinen was not as successful with the interior design as with the exterior. The Dulles terminal is not "rinky-tink", but then neither is it warm and friendly. It is large and lonely with seats placed in long rows, bolted together with armrests clearly marking off each person's space (see Robert Sommer's "Our Airports are Sociofugal, Not Sociopetal, and It's an Outrage" in The New York Times Magazine, March 3, 1974).

The interior is not without its technical problems as well. According to one airport official interviewed, the public address system was so technically advanced as to be one of a kind when it was installed, and as a result, maintenance has been a nightmare. In fact, the airport's maintenance people basically have redesigned and replaced the original public address system. Similarly, a special sign system was constructed for the terminal's interior by an Italian firm. This, too, frustrates the maintenance personnel at Dulles. General maintenance and repair on the sign system is almost impossible because the instructions and schematics for the system are printed in Italian. It seems that Dulles, in its own way, like D/FW, is paying for heavy emphasis on the dramatic or symbolic in its design.

The Mobile Lounge: The mobile lounge has been widely publicized as a remarkable idea, and the evidence seems to indicate that overall those in use have been quite functional. However, some of the officials interviewed at Dulles talked as if the mobile lounges were little more than a slightly happier version of the Airtrans system at D/FW. The first mobile lounges were manufactured by Chrysler, who subcontracted the body building to Budd. Apparently, the bodies built by Budd were very good because they are still in operation; but Dulles officials claimed that the components supplied by Chrysler were not as good. The lounges were powered by gasoline engines designed for automobiles in which the power had been boosted simply by pouring more raw gas into the engine through a bigger carburetor. As a result, the engines burned out very quickly. The transmissions, it seems, were similarly underdesigned, while the air-conditioners were not applicable to the mobile lounge at all. The air-conditioners were basically four room-type units hooked together in such a way that service was not feasible. After the airport manager ordered the exchange of the engines and transmissions for diesels and heavy-duty transmissions and replaced the air-conditioning systems, the lounges performed very reliably.

Nevertheless, the mobile lounges continue to attract their share of critics, as well as supporters. Architectural critic, Paul Goldberger, claims that they are silly and inconvenient and "whatever pretentious words were uttered about the lounges as an advance in airport technology,

their real purpose was to keep the elegant terminal building free of protruding fingers" (Esquire, February, 1976, p. 104). Architectural historian Vincent Scully contemptuously dismissed them as "Afrika Korps troop carriers" (quoted by Paul Goldberger in Esquire, February, 1976, p. 104).

We feel that whatever the intended purpose for the mobile lounges, they offer an economy, flexibility, and concern for passengers and operations personnel we have not found in other airports.

Other Difficulties

Utilities: Heating and air-conditioning for the new airport is a single, central installation. But the Dulles design, unlike that for D/FW, for example, did not have excess utilities capacity. The system at Dulles was designed for the first stage construction, and according to the master plan, new construction must include additional heating and cooling installations.

The airport at Chantilly, on the other hand, was plagued by sewage and run-off drainage problems, and when the local communities felt they could not process waste and run-off from the airport, the objections became so strenuous that they were raised in Congress by the Virginia delegation. The Congressional solution was interesting: sewage and drainage from the airport was tied to the District's water treatment system. This "interceptor" sewer line was constructed with a twenty-five

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million dollar loan authorized by Congress. The new sewer line was large enough to accommodate the airport's needs, as well as those of the many growing communities in the area. Thus the loan was to be repaid by these "secondary customers" using the facility. The remedy effectively checked this type of local opposition to the new airport facility.

Access: No planned or existing state or federal highway passed close to the Chantilly site. A dual, four-lane roadway was constructed from major arterial connections, including the Capitol Beltway and Inter-state 66, to the terminal complex. The route selected was slightly less than twenty miles. The idea was to reserve this road for airport traffic. Toward that end, few interchanges were constructed and space was reserved to lay outer roadways to serve surrounding communities when the need developed. At the time of the airport's construction commuter traffic was no problem. One of the site criteria at Chantilly that was more than adequately fulfilled, was that of low population density in the region of the airport.

Despite the deliberate attempt to provide a flexible access system, Dulles officials commented that they are now having difficulty keeping the road free of commuter traffic. Neither the state nor the counties involved want to expend their limited revenues to construct the outer roadways provided for in the initial design, especially when a beautifully constructed and maintained four-lane access highway is already in place and hardly used by today's standards. Thus far, the Secretary of Transportation

has been able to stay commuters' demands for more and better access by invoking the "intent of Congress" when the enabling legislation for the Dulles access highway was approved.

Noise: Until quite recently, the Dulles Airport has not had any difficulty over noise. In the early years of its operation, under-utilization, low population density, and remoteness combined to protect the airport from such complaints. And too, 10,000 acres allows quite a bit of space to absorb the particularly intense noises associated with approach and departures of planes. In addition to all this, the airport boundary is lined with a thick belt of trees to beautify and further absorb noise. Though Congress and the Executive remained embroiled in controversy with communities in the Burke area for more than seven years over this issue, the master plan does not even mention the problem.

Officials associated with Dulles and the Washington airport system admitted that they had been getting complaints about Dulles' noise in the past three or four years because of increased suburban development near the airport. It appears to be very difficult to cope with a noise problem, as it is so often ephemeral. One official recited the story of a civic group leader from a community near the airport who came to them not long ago to talk about noise problems in his community. The civic leader said he understood the necessity to alter flight patterns after an airliner crashed into a mountainside a year or two before. He claimed that the citizens in his community also understood and had been patient; but they

felt the airport officials had had enough time to correct difficulties and/or acquire better approach equipment. The agitated citizen concluded by fervently petitioning the officials to reinstate the original flight patterns so the noisy aircraft would not be continually overflying their neighborhoods.

The astonished officials attempted to convince the spokesman that the approach and departure routes had not, as a result of the crash or for any other reason, been changed in any detail. They had considerable difficulty convincing the citizen of their veracity. When asked what had happened, the official shrugged and said that the citizens probably had not noticed the aircraft flying near them until the publicity surrounding an accident in their vicinity sensitized them and they could not help but notice the aircraft thereafter.

Press: The press coverage of the Dulles Airport over the years seems to have been very like that for D/FW. The airport is either ballyhooed as the finest example of this or that, or it is ridiculed as the world's single largest white elephant.

Current Operations, Problems and Prospects

Eighteen Months Late and Still Trying to Catch Up: Dulles was scheduled to begin operation early in 1961, but like most projects of similar scope and difficulty, it was not ready on time. The schedule slipped further and further and the airport did not begin operating until November of

1962 - nearly eighteen months later. Ever since it opened, officials associated with the airport have been claiming that it is just about to come into its own (c.f. The New York Times, November 20, 1964). In fact, we even heard it when we were working in the Washington area. It seems that people have preferred the convenience of overcrowded, unsightly Washington National to the beautiful but remote Dulles. The original expectation was that Washington National would level off at its "design capacity" of six million passengers per year, while Dulles assumed the growth curve. But the fact is that Washington National has ballooned to more than eleven million passengers annually, while Dulles limps along nearly empty most of the time (see Chart I below). One can readily see from these charts that Dulles has not begun to fulfill its designers' expectations. Only in the area of cargo has it at last begun to measure up to the plan. Moreover, it is not clear whether Dulles would be carrying its present share of the region's air passengers if the FAA, in 1966, had not forced the airlines to increase their schedules from Dulles by limiting National to short or mid-range jet aircraft and to flights of 500 nautical miles or less. This action doubled the daily aircraft operations at Dulles, increasing take-offs and landings from 90 to 180 (c.f. The New York Times, July 12, 1966). Yet it is obvious that many airlines have circumvented this FAA limitation by scheduling many of their flights to Washington National with an intermediate stop at a city within the 500 mile limit.

• CHART 1

PASSENGER VOLUME (Millions)

	MASTER PLAN PROJCTIONS	ACTUAL PASSENGER VOLUME ^①
DULLES		
1965	4.4	.863
1975	8.6	2.6
Ultimate	14	
NATIONAL		
1965	5.0	6.5
1975	7.0	(1974) - 11.0

① From F.A.A. Department of Aviation Economics

CHART 2

① AIRCRAFT OPERATIONS (Thousands)

MASTER PLAN PROJECTIONS ② ACTUAL OPERATIONS

DULLES

1965	114	80
1975	218	131
Ultimate Design Capacity	280	

NATIONAL

1965	290	297
1975	366	No Data

① Military operations not included in figures for Dulles and National

② From F.A.A. Department of Aviation Economics

CHART 3

CARGO (Including mail) in Tons (Thousands)

MASTER PLAN PROJECTIONS

① ACTUAL CARGO

DULLES

1965	20.9	13.8
1975	39.9	1974 - 48.8
Ultimate Design Capacity	59.9	

① From F.A.A Department of Aviation Economics

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Business at Dulles has been increasing as the charts indicate. The growth rate recently surpassed both that of Washington National and Baltimore's Friendship Airport. Still, the Washington Post reported in December of 1974 that Dulles lost 4.9 million dollars in fiscal year 1973, while National earned 5.2 million dollars.

Airport authorities still maintain that the cost of building Dulles will be recovered within the promised thirty year period. And they very well may meet that schedule despite Dulles' disappointing economic performance to date. It seems that the landing fees at Dulles are supported by the booming business at Washington National. Since both airports are managed for the FAA by the Washington Airport Authority, the Authority has constructed the landing fee schedule so that it is considerably higher than need be charged at National, considering its revenue/cost ratio, and is much lower than would otherwise be charged at Dulles with its cost/revenue imbalance.

Clearly Dulles, too, suffers from excess capacity, certainly not mitigated by its considerable investment in symbolism, as well as functional needs. For example, the terminal building cost about \$100 per square foot to construct, making it an expensive edifice by any standard. Office buildings typically range from \$25 to \$35 per square foot, and public monuments run in the neighborhood of \$50 per square foot. This, then, adds to the financial imbalance demonstrated by Dulles.

CHAPTER FIVE

Montreal: Experiment at Mirabel

Montreal International Airport (Mirabel)* is an interesting case, particularly so in that one wonders whether more than twenty years' design and operating experience in the United States had any effect on this Canadian project. The answer is, at least in part, yes. At Mirabel, the design group adopted a basic concept pioneered at Dulles. That is, they chose to divide landside from airside operations, connecting them by mobile lounges. The new Montreal facility also was like Dulles in that it was funded, designed, and constructed under the aegis of the national government.

Yet Montreal is different from our other cases, including Dulles, in several intriguing respects. The lands encompassing the airport were expropriated by the Canadian government; it was the largest such acquisition in Canadian history. The airport facility itself rests on a respectable 17,000 acre site, but the government assumed control over more than 75,000 adjoining acres. Thus, Mirabel's 93,000 acre package is an order of magnitude larger than most regional airports.¹ The peripheral 76,000 acres

*Our visit to Mirabel was in August, 1975, three months before it opened.

¹

Except for about 253 residents of the area all land acquisitions have been settled. It is this group that has vigorously protested and demonstrated against the opening of Mirabel. The protests have pressured the government in Ottawa to grant an extra ten percent to all area property owners (The Gazette, July 31, 1975; Le Jour, August 11, 1975). Demonstrators attempted to halt the official opening ceremonies of Mirabel; they were repelled by tear gas (The Dallas Morning News, October 4, 1975).

is intended to buffer residents from noise and other airport related pollution and to protect the airport from unsightly, unplanned development.²

In the immediate vicinity of the airport only four villages remain with a total population of 6,000. Around the territory the development of Mirabel and other related activities will definitely enhance the social concentration of the area. If the projections are close to the mark, the five next closest communities with a combined population of 142,500 (in 1971) will double by 1986 (Airport Peripheral Land, Information Service, October 1974, p. 27).

Transport Minister Jean Marchand admitted that too much land had been expropriated and that the government is "quite ready to resell part of the Mirabel lands it owns" (Province, March 1, 1975, p. 2). The initial costs of building Mirabel were set at \$200 million dollars, but at completion it had cost more than \$424 million. Most of the excess costs were borne by the federal government (The Gazette, May 2, 1975). An interviewee indicated that the Ministry of Transport (MOT) anticipated recovering the cost in twenty-five years.

2

For specifics on the zoning bylaws see Ministry of Transport, New Montreal International Airport Zoning Bylaws, Numbers 1a, 2a, 3a, 4a, and 5a, Revised, August-December, 1972. Also, Toward a New Definition of Ecology for the New Montreal International Airport, by Pierre Dansereau, 1973.

It seems, then, that the Canadians concluded, perhaps from others' operating experiences, that previously existing regional facilities were not large enough to significantly reduce the nuisance factors. However, one important nuisance factor that Montreal could not eliminate because of its immense size was accessibility. In fact, in view of the constant, spreading density patterns which characterize most urban centers, it seems a likely hypothesis that accessibility and size will be directly and inversely related. Thus, it is not surprising that Mirabel is the most remote of the regional airports studied. It is thirty-five miles from Montreal, and rail, road, and public transit service to the airport is far from good.

Another nuisance factor is that the Canadians have completely divided the domestic and international traffic in the Montreal area; Mirabel will process only arriving and departing international flights.³ A less strict division between Washington National Airport and Dulles has been responsible for complaint and conflict between the airlines, the FAA, Congress, and the user public. It will be interesting to see if similar conflicts develop in response to this dichotomy at Montreal.

In sum, while it is too soon to tell whether the policy and design choices at Montreal will enable it to escape some of the difficulties that

³ Service from Mirabel will be to Europe, Mexico, the Caribbean, and South and Central America.

have persisted in other regional airport designs. It is flexible like Dulles, though not as symbolically intense. National governmental control obviates the sometimes crippling consequences of regional conflict. However, inaccessibility, together with rigid air route division, will become a serious problem for any wishing to transfer between domestic and international flights. The point is, in a project of the regional airports' scope, because of interactive effects resulting in inverse relationships, it may be that problems cannot be effectively minimized; they can only be traded off.

Planning, Design and Construction

Although construction of Mirabel was to be a joint federal and provincial venture, the ultimate decisions regarding the design, fabrication, and finally the operations, were made by Ottawa and the Ministry of Transport (MOT). It was the MOT that launched a study in 1966 to examine what measures should be taken to alleviate the expected saturation at Dorval, (Montreal's International Airport before Mirabel) in the late 1970's. This same study indicated that the terminals at Dorval would reach saturation levels in 1975.⁴ At that time, the cost of purchasing land in order to expand Dorval was prohibitive, and in addition, massive legal

⁴In 1973 Dorval recorded 7.5 million passengers. The traffic volume had increased by 200 percent from the previous decade.

fight over the noise pollution from Dorval had begun.⁵ A cost-benefit analysis was conducted by MOT that indicated it was more feasible to build a new airport and restrict Dorval to about four million passengers annually than to expand Dorval. Several interviewees indicated that future plans now anticipate closing Dorval. Whether it will, in fact, be closed depends largely on the economic vitality of the commercial air industries.

Site Selection

A site selection study was launched by the MOT and some thirty possible locations were investigated. Several of the sites located to the south and east of Montreal were rejected because it would be very costly to build bridges over the St. Lawrence River. Furthermore, the agricultural lands in the south were too valuable and expensive to purchase for an airport site.⁶ Ultimately, the Ste-Scholastique site (which is now Mirabel) was selected by Ottawa. The factors that made this site attractive were: it was an economically depressed area; it had marginal farming communities; land was cheap; and, in the end, Ottawa hoped to revitalize this region northwest of Montreal.⁷ Lastly, air space at this

⁵ Legal battles over noise pollution still threaten to close Dorval. See News and Chronicle, July 24, 1975, p. 2.

⁶ The provincial government recommended a site at Drummandville, north of Montreal. The recommendation was rejected by Ottawa.

⁷ A total of \$120 million dollars has been paid in claims to the residents of this area.

proposed site was the best; that is, approach and departure routes did not overfly United States territory.

On the other hand, the disadvantages of the Mirabel site, situated as it is thirty-five miles northwest of Montreal, were poor rail connections, rapid transit services, and freeways⁸ (see Illustration I).

The ministerial planning group, known as the New Montreal International Airport Project Office (BANAIM), began work early in 1969. Its mandate was to develop the airport master plan and to coordinate the phasing, design, and construction activities. Direct implementation of the master plan and the field work was contracted to International Airport Consultants of Montreal (CAIM). BANAIM and CAIM were a mixed group including specialists from the public and private sectors. The Ministry of Transport retained veto power through all phases of Mirabel's construction. In our investigation no one group or set of individuals stands out. It would appear that these consortiums combined experienced and inexperienced personnel. No major schisms were evident among the groups, and the ultimate decision-making authority rested in Ottawa. If a conflict existed

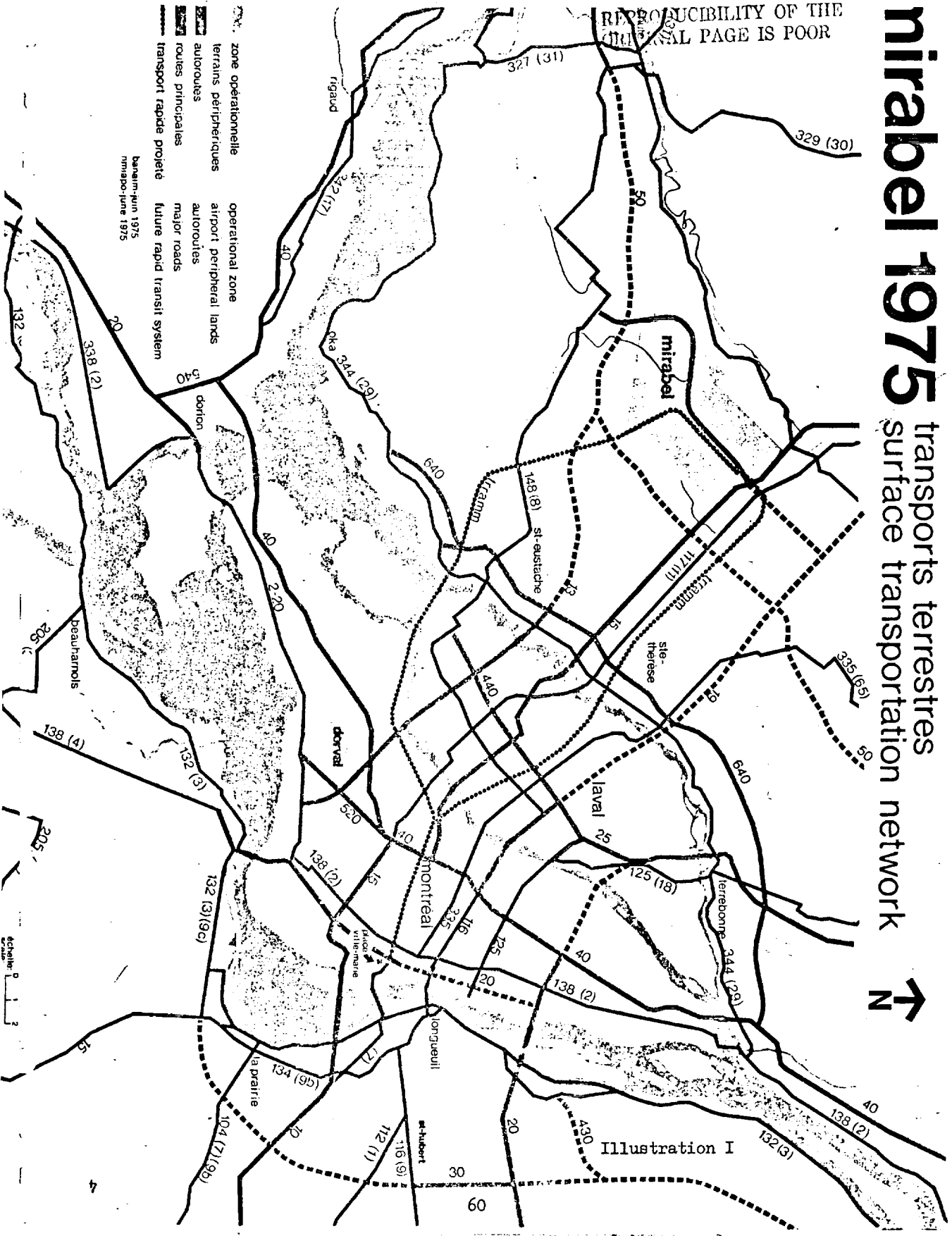
8

The cost by taxicab from Mirabel to downtown Montreal is \$30, while bus service costs \$3.50 and takes at least one to one and a half hours. A feasibility study is under way to consider the possibility of constructing a rapid transit system (TRRAMM) linking Montreal to Mirabel. For a detailed study of this plan see TRRAMM, Department of Transport, Government of Quebec, 1974. It is estimated that TRRAMM would cost \$400 million dollars (The Gazette, July 10, 1975).

mirabel 1975 transports terrestres surface transportation network



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zone opérationnelle
terrains périphériques
autoroutes
routes principales
transport rapide projeté

zone opérationnelle
airports peripheral lands
operational lands
major roads
future rapid transit system

barneim-juin 1975
mirabel-juin 1975

Illustration I

Ottawa would resolve the issue and CAIM would implement the decision.⁹

The master plan for Mirabel emphasized operating efficiency and left decisions open as long as possible, in the event technologies or needs changed (Passenger Terminal Concept Development Studies, New Montreal International Airport, June 1, 1971, pp. 1-23).

The basic planning philosophy sought to optimize the relationship among four key airport variables: air space management, runway capacity, ground facilities (e.g., passenger throughput), and airport access. "An optimum airport development would be achieved when the demand/capacity relationships between the four variables are balanced at the point of lowest cost and highest level of service" (Montreal International Airport Project, Department of Transport, 1970, p. 26).

Within these constraints, ten basic airport schemes were developed, and several variations of each design were considered. In the end design 8-D was chosen because it promised more planning flexibility for long-range development (see Illustration II).¹⁰

⁹ Quebec Province also created an organization called SATRA (Planning Service for the Airport Region), and it compiled an impact study of the Ste-Scholastique area. Overall Quebec Province had minimal input in Mirabel decisions. Some jurisdictional conflict between Ottawa and Quebec did surface at the outset, which caused delay in the construction phase of Mirabel.

¹⁰ For specific details of these plans see Montreal International Airport Project, op. cit., pp. 26-32.

MIRABEL: FIELD LAYOUT

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AUTRE PROJET DE PISTES 8D

PROJET D'AUTOROUTE DE L'OUEST
PROPOSED WESTERN ACCESS AUTOROUTE

STE SCHOLASTIQUE

C.P.R.

C.N.R.

PRECEDING PAGE BLANK NOT FILMED

- ZONE DES PASSAGERS
- ZONE DU FRET
- ZONE D'ENTRETIEN
- PASSENGER AREA
- CARGO AREA
- MAINTENANCE AREA

ALTERNATIVE RUNWAY SCHEME 8D 8

AUTOROUTE DES LAURENTIENS
LAURENTIAN AUTOROUTE

Illustration II

milie pieds
thousand feet

0 1 2 3 4 5 6

The objectives specified in the design of the passenger terminal included minimizing walking distances and service time, and providing adequate space and equipment for rapid, simple operations, as well as ease of movement between operations.¹¹ In optimizing the above characteristics the remote gate concept (as used at Dulles International) was thought to be the best design to fulfill these purposes.¹² Three features of the remote gate concept were particularly attractive to the design group:

- 1) centralizing facilities into one building provided for:
 - minimum repetition
 - maximum revenue potential for concessions
 - easy access to terminal and airline areas
 - convenient location for mass transit
- 2) the apron passenger-transfer system offered:
 - short walking distances; only 300 feet from the terminal entrance to the people mover
 - passenger traffic separation
 - independent adaptability of airside and terminal building
 - full gate interchangeability
- 3) the open apron concept allowed for:
 - maximum adaptability of the apron
 - flexibility in aircraft handling
 - easy maintenance of the apron
 - easy adaptability of the apron
 - unrestricted visibility for apron control (Ibid., p. 7-29)

At conventional airports, aircraft that are parked adjacent to the terminal are in essence physically connected to the facility by a leading

11

For a detailed analysis see Passenger Terminal Concept Development Studies, op. cit., pp. 7-3 to 7-32.

12

Other terminal designs considered were those for Tampa, Dallas/Fort Worth, Houston, Vancouver, and Toronto.

bridge. When the aircraft is tied to the terminal, the walking distances and terminal size are functions of the number of parked aircraft and their wing span rather than the space needed for passenger processing. If expansion is necessary (for aircraft parking or passenger processing) it is generally necessary to expand both the apron and the building simultaneously because of the linkage required between aircraft and structure.

On the other hand, the detached gate concept provides flexibility so that the apron or the terminal may be expanded independently. In addition, the geometry of the terminal is primarily influenced by passenger processing considerations if aircraft are physically removed from the terminal, thereby providing flexibility for handling passengers and baggage.

Commonality among services exists at Mirabel; thus gates, departure announcements, baggage, and so on, are controlled completely by airport operations (see Illustration III).¹³ From the passengers' perspective, the terminal design fosters simplicity and clarity. All passengers, whether arriving or departing, will be processed in a straight line

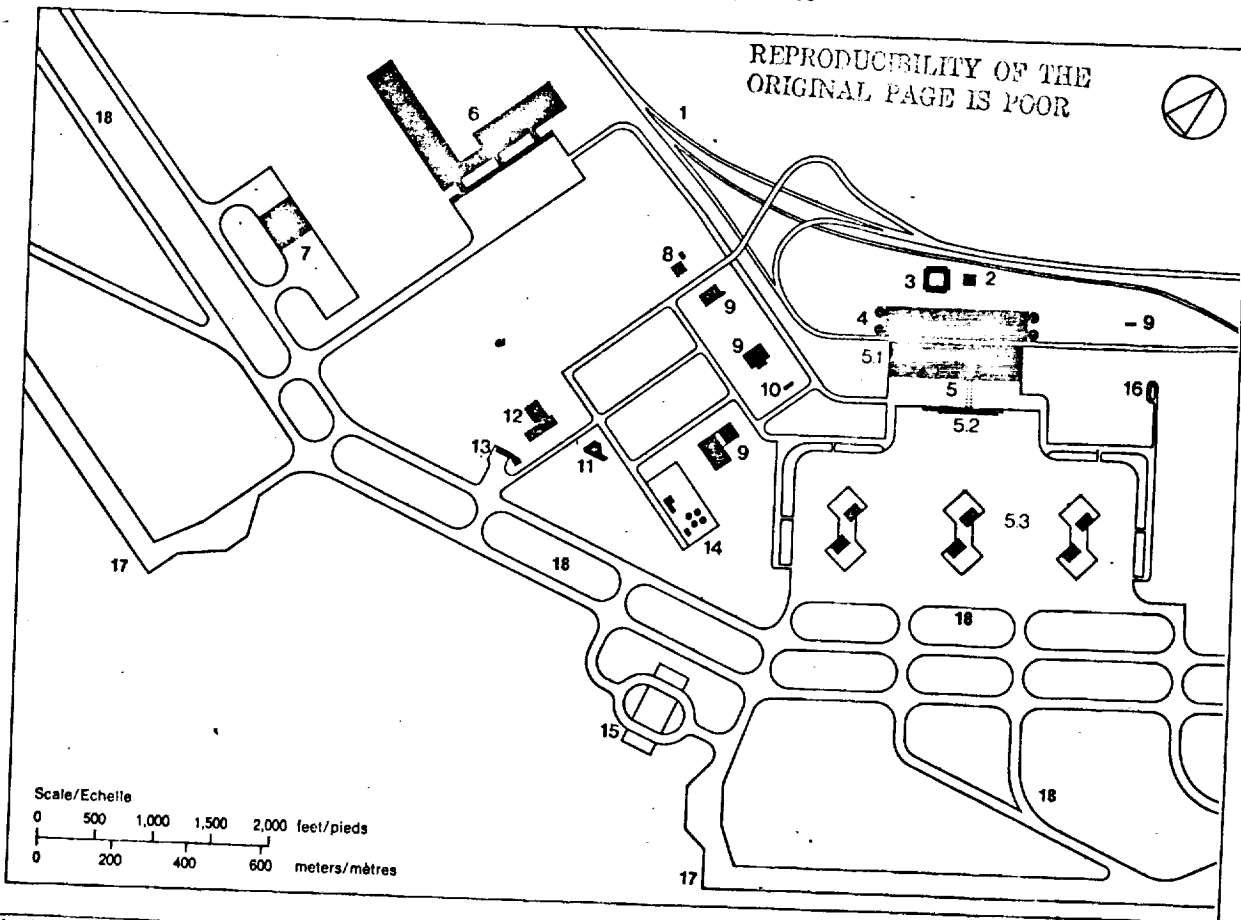
13

There are a total of twenty-three airlines operating out of Mirabel. Air Canada has the largest investment in space, equipment, and operations - some forty percent of all activities. There are eighteen gates and six additional gates for domestic flights at the Aeroquay. On the apron side there are three airline service areas. Each area can service six aircraft. The configuration will usually be four 747's and two other aircraft.

MIRABEL: TERMINAL COMPLEX

Phase I
New Montreal International Airport (YMX)
Mirabel, Québec

Phase I
Nouvel aéroport international de Montréal (YMX)
Mirabel, Québec



- 1 Spine Road
- 2 Administration Building
- 3 Hotel "Château Mirabel"
325 rooms
CP Hotels, owner and operator
- 4 Terminal Parking Structure
capacity 2,400 cars
- 5 Passenger Terminal Complex
- 5.1 Terminal Building
1,160 feet x 300 feet
940,000 square feet
25,830,000 cubic feet
capacity 6,000,000 passengers
per year
3,300 passengers per hour
(departures peak)
2,900 passengers per hour
(arrivals peak)
22 passenger transfer vehicles
- 5.2 Aeroquay
6 aircraft stands
- 5.3 Apron
3,335 feet x 2,025 feet
4,521,000 square feet
18 aircraft stands
3 airline service areas

- 6 Air Cargo Complex
500,000 square feet
capacity 400,000 tons per year
- 7 Aircraft Line Maintenance
Hangar (1977)
- 8 Central Heating/Cooling Plant
and Reservoir
- 9 Third Party Facilities
- 10 Electrical Substation
- 11 Control Tower
height 215 feet
- 12 Ministry of Transport
Service Centre
- 13 Fire/Crash/Rescue Centre
- 14 Fuel Tank Farm
- 15 Aircraft De-icing Station
- 16 Aircraft Sewage Dumping
Station
- 17 Runways
2 in tandem
12,000 feet long x 200 feet wide
- 18 Taxiways
84,000 feet total length
75 feet wide

- 1 Artère principale
- 2 Edifice de l'administration
- 3 Hôtel "Château Mirabel"
325 chambres
CP Hotels, propriétaire et exploitant
- 4 Stationnement à l'aérogare des
passagers
capacité 2,400 véhicules
- 5 Ensemble de l'aérogare des
passagers
- 5.1 Aérogare
1,160 pieds x 300 pieds
940,000 pieds carrés
25,830,000 pieds cubes
capacité 6,000,000 passagers
par année
3,300 passagers partants
(heure d'affluence)
2,900 passagers arrivants
(heure d'affluence)
22 véhicules transbordeurs
- 5.2 Aéroquai
6 postes de stationnement pour
avions
- 5.3 Aire de stationnement des avions
3,335 pieds x 2,025 pieds
4,521,000 pieds carrés
18 postes de stationnement pour
avions
3 centres d'avitaillement

- 6 Ensemble de fret aérien
500,000 pieds carrés
capacité 400,000 tonnes par année
- 7 Atelier d'entretien des avions (1977)
- 8 Centrale de chauffage et de
refroidissement; réservoir d'eau
- 9 Installations réservées aux
concessionnaires
- 10 Poste d'énergie électrique
- 11 Tour de contrôle
hauteur 215 pieds
- 12 Zone de service du ministère
des Transports
- 13 Poste de secours
- 14 Réserve de carburant
- 15 Poste de déglacage des avions
- 16 Poste de décharge des égouts
d'avions
- 17 Pistes
2 en tandem
12,000 pieds de
longueur x 200 pieds de largeur
- 18 Voies de circulation
longueur totale de 84,000 pieds
largeur 75 pieds

Transport
Canada
New Montreal International
Airport Project Office

Project Managers
CAIM
International Airport Consultants
of Montreal Ltd.

Transports
Canada
Bureau d'aménagement du nouvel
aéroport international de Montréal

Gérance du projet
CAIM
Les Consultants en Aéroports
Internationaux de Montréal Ltée

across the building, with no changes in levels. The nominal walking distance is about 300 feet.

The airlines have been quite dissatisfied with the design format of Mirabel, primarily because it goes against the traditional grain of airport operations. The airlines want to have complete control over all aspects of their terminal operations. In the case of Mirabel, airport operations or MOT makes all the decisions. Only in the ticketing area will the airlines be free to exercise control.

Other Difficulties

There are, however, more specific criticisms of Mirabel. In particular, the airlines are concerned about the operation of the passenger transfer vehicles (PTV's).¹⁴ With the exception of two PTV's, none of the others have been tested in the inclement winter weather of Montreal. An interviewee indicated that the PTV's "have not been proven as yet." Some of the airport's managerial personnel will be familiar with the equipment, but the PTV drivers will be drawn from the private sector. But, according to one interviewee, this will not preclude a crippling effect if the drivers strike.

14

The airport opened with fourteen PTV's and plans to acquire twenty-two by 1979. Each carries 150 passengers and costs \$400,000. An additional \$50,000 was spent on each PTV to work out design defects. Two of these PTV's were used for about four years at Dorval in an attempt to anticipate the kind of problems they will encounter in -40° F. weather and 120 inches of snow. The airlines will compensate the airport for the use of the PTV on a per trip basis, as they do at Dulles. Estimated costs are \$300 per trip, compared to \$50 for using an airbridge at Dorval.

Another gnawing PTV problem of concern to the airlines is that the passengers under this system encounter an additional interface (inconvenience) both in enplaning and deplaning. Also, special cases (ambulatory, late arrivals, etc.) must be processed some other way, since the PTV is incapable of handling such cases. One official interviewed was concerned that the PTV's would require considerable maintenance, while repair turnaround might be quite slow.

Another worry voiced by the airlines was that the de-icing pad would not be operational until winter of 1978. Meanwhile, aircraft de-icing would be done by mobile trucks. This is not only a costlier process, but also a time-consuming one that could create delays in flight operations.

Of all the airlines utilizing Mirabel, Air Canada's operations are most affected. For the most part, Air Canada is the only airline that is required to split its operations between Dorval and Mirabel. That is, all international flights by Air Canada must originate and terminate at Mirabel. All domestic flights and trans-border flights (to the United States) will continue to operate out of Dorval. In 1985 the trans-border flights will be transferred to Mirabel.¹⁵ However, there will be a few domestic flights from Ottawa and Quebec City to Mirabel in an attempt to minimize transfer passengers at Mirabel. These flights will utilize the Aeroquay, which has six aircraft stands (see Illustration III). "Generally for the carriers, which will have to operate from both Dorval and Mirabel, costs will increase

¹⁵

In 1973 traffic at Dorval was 55 percent domestic, 23 percent international, and 22 percent trans-border. In the first year following the opening of Mirabel, 5.2 million passengers are expected to use Dorval and 3.7 million are expected at Mirabel. By 1985 forecasts for Mirabel are put at 17 million passengers.

by twenty-five to thirty-five percent." The Director of Properties and Facilities for Air Canada, H. W. Torrell, indicated that "for Air Canada alone, being at Mirabel will cost an extra two to four million dollars annually" (Province, March 1, 1975, p. 1).

Passengers arriving at Dorval from other parts of Canada or transfer passengers from international flights will require at least two and a half hours of lead time to make the necessary transfer connections.

Provisions have been made to accommodate STOL aircraft at Mirabel, although a STOL port is not contemplated "until the need arises". It may be that because Mirabel is so remote, STOL aircraft offer a viable alternative to surface movement of passengers, especially if the TRRAMM system encounters further delays.¹⁶

Noise generally has a serious disruptive effect on communities adjacent to airports, to the extent that some have imposed curfews on aircraft operations. The hope is that Mirabel is buffered sufficiently to operate around the clock. In order to avoid the noise problem, forecasts were formulated for various years of Mirabel's development. The predictions were based on the FAA's noise exposure forecast units (NEF). These are single value units which combine the effects of aircraft noise

16

At present, the Ministry of Transport is in the process of developing and evaluating a STOL commuter service between Ottawa and Montreal. DeHavilland's Twin Otter (DHC-6 STOL) aircraft are being used for this experiment. The STOL ports are located five and twelve minutes from downtown Montreal and Ottawa, respectively. The DeHavilland Dash, which can carry fifty people, will soon be put into operation. For details, see Canada STOL Project; ADAC Canada, Ministry of Transport, 1974. Also Canada Aviation, May, 1975, pp. 27-29; Montreal Star, February 8, 1975, pp. 8-9.

and daily flyover frequencies, measured in terms of decibels. Using this formula, nuisance contour curves were developed. These noise forecasts will be updated annually as traffic patterns change or increase. In addition, monitoring and surveillance systems have been installed. If there is strict enforcement of the land use plan and continuous noise monitoring, officials at Mirabel hope that complaints about noise will be kept to a bare minimum. Part of the justification for Mirabel's location can be attributed to BANAIM's concern for noise pollution. When discussing this problem with officials at Mirabel, it was evident that they were concerned about public reaction. In most cases these same officials were most reluctant to discuss the subject or to allow us to borrow documentation from BANAIM's library on this topic.

Current Operations, Problems and Prospects

Our discussion thus far has been focused on Phase I development at Mirabel, which encompasses only one-third of the operational 17,000 acre zone. Its future expansion will depend on the economic growth of the air industry in the 1980's. "All options are open to us", according to an interviewee, "as it pertains to what future terminals and other facilities we will build." Unlimited flexibility would appear to be the by-word for accommodating future needs, and this naturally depends to a large extent on technical developments in the transportation and communications industries.

A truly international airport, Mirabel's public relations represents it as "The Gateway to Canada" and the largest airport in the world. Such

public relations phraseology is similar to that of D/FW's or Dulles's, to name but two. Regardless of what image Mirabel projects, it is our opinion that symbolically it does not really have the impact on the community that D/FW has had. Both the cities of Dallas and Fort Worth spent exorbitantly to foster this image. Montreal, to date, has not done so.

Like D/FW, however, Mirabel is viewed as an economic multiplier for the Montreal metropolitan area. Projections indicate that socio-economic conditions for the area around Mirabel will be positive. The various projects that will be precipitated by Mirabel (i.e., TRRAMM, new freeways, etc.) will further help the economy of Montreal.

Overall, Mirabel is a fairly straightforward airport, utilizing very few technically intense systems like Airtrans or Docutel. The PTV is perhaps its most controversial element, but then even this system had already been tested successfully at Dulles. What is completely different and controversial at Mirabel is the role played by the airlines vis a vis the airport authority. Thus far the Ministry of Transport has had complete control over all the decisions, and it has been relatively unfettered because it is politically removed from local government contests, and thus, the citizenry. This has given the MOT flexibility that other community agencies ordinarily do not have in building their own airports. It remains to be seen whether nationally-owned regional airports like Mirabel and

Dulles will be the wave of the future for airport construction . . .
the jury is still out.

CHAPTER SIX

Tampa: Different and Successful

Tampa International Airport (TIA) differs from other regional commercial airports studied in this project. It handles less traffic, and it is a nearly unqualified success.

TIA is located on the east shore of Old Tampa Bay, the western arm of Tampa Bay. It serves a Florida gulf coast urban complex that includes Tampa and Hillsborough County, St. Petersburg and Pinellas County, and Pasco, Manatee and Sarasota Counties, collectively called the Tampa Bay Region. Like other Florida urban areas, the Tampa Bay region has experienced rapid population growth since World War II, and continues to grow. By 1970 the Tampa-St. Petersburg metropolitan area population was just over one million, or about fifteen percent of Florida's total. In the 1970's, and for the foreseeable future, TIA is proving successful as a techno-system serving the growing regional demands for commercial air travel.

TIA's success as a regional airport was not inevitable. Less than fifteen years ago, airports at both Tampa and St. Petersburg were competing for commercial airline service to the region, and neither had terminal or runway facilities adequate for growing traffic. This chapter traces the emergence of TIA in the 1970's as an innovative solution to the

region's commercial airport needs. One section examines the socio-political development of TIA. It focuses on the evolution of a resilient and competent system of airport governance, political and administrative, that could translate fiscal and technical resources into a viable and adaptive system of airline service. The second section bears on the evolution and implementation of TIA's new terminal design. The final section reviews TIA's current operations, problems and prospects.

Background: Tampa Becomes a Regional Air Center

Tampa and St. Petersburg are the dominant urban centers in the Tampa Bay Region. Tampa, folded around the two northern arms of Tampa Bay and spreading north and east, has historically been a center for industry and shipping. Its essentially white middle-class character has been tempered by a sizeable black minority and a long-established Cuban-American community. Union labor is stronger in Tampa than in most southern cities of equivalent size, and the politics of Tampa and surrounding Hillsborough County have been Democratic, ranging from traditional to increasingly liberal. To the west, St. Petersburg occupies the southern end of Pinellas Peninsula, which separates Tampa Bay from the Gulf of Mexico. The city and the numerous beach communities to the north are settled largely by white middle-class retirees and employees of various businesses comprising an active tourist industry. The politics of St. Petersburg and Pinellas

County have been conservative Republican since the mid-1950's.

Tampa Bay was the site of the first American commercial air flight, a trip from St. Petersburg to Tampa in 1916. But commercial aviation was a relatively minor activity here until the end of World War II. The postwar development of Tampa's commercial aviation facility can be divided into two periods. The first was one of rivalry with a competing air facility in St. Petersburg, a rivalry that lasted until 1961. The second period was one of transformation, in which TIA faced its new problems as the principal commercial facility for the region. During both periods, a key factor was the existence and survival of a viable governing agency, able to provide and guide the development of Tampa's aviation facilities.

Rivalry with St. Petersburg (1946-1961)- Since World War II, the most consistent growth industries in the Tampa Bay Region have been retirement-settlement and tourism. The principal beneficiaries of this growth have been the communities in Pinellas County, between the Bay and the Gulf, and in Manatee and Sarasota Counties, south of Tampa Bay. Tampa has also benefited from tourism, but it has grown in other respects, as well, and has retained its character as a center of industry and commerce.

The present site of TIA has never been the sole location, actual or potential, for commercial aviation in the region. Sarasota has long

maintained a facility to serve the smaller cities south of Tampa Bay. But Tampa's main rival for commercial trunk routes in the first decade after the war was St. Petersburg - the only other city in the region approaching Tampa's size, and one much better located for access to the region's tourist attractions of nearby beaches and fishing. By the mid-1950's, St. Petersburg was bidding strongly to capture all or a major share of the commercial traffic in the region.

In the 1930's, Tampa had lost out to Miami when Pan American decided on a base for its early seaplane-oriented operations. But Tampa had developed its small commercial airport on Davis Island, near the downtown area, and the city also owned a small facility at Drew Field, on TIA's present site. The City of Tampa leased Drew Field for military use during the war, but reacquired it, considerably enlarged in land and facilities, in 1946. A year earlier a special act of the state legislature created the Hillsborough County Aviation Authority (HCAA), and charged the Authority with the operation and development of all publicly-owned airports in the County. The City of Tampa then turned over custody and use of the reacquired Drew Field to the new HCAA. The facility, renamed Tampa International Airport, began operations as Tampa's primary commercial facility in the same year, with service offered by National and Eastern Airlines.

HCAA proved a remarkably effective institution for the governance and promotion of commercial aviation facilities. Its governing board is com-

prised of the Mayor of Tampa (ex officio), one of the Hillsborough County Commissioners (also ex officio), plus three members appointed by the Governor of Florida. Until the early 1960's the three gubernatorial appointees were in fact nominated by the Tampa Roundtable, a civic council whose members are heads and former heads of Tampa's principal civic organizations. The law explicitly permitted, but did not mandate this arrangement. From the beginning, then, the HCAA Board had good ties to the community's political and business leadership. While that leadership has never displayed dynamic ambition on a national or even statewide scale, it nonetheless did encourage and support the HCAA Board's efforts to expand and improve commercial aviation services at TIA.

By the mid-1950's, some airlines serving the Tampa Bay Region began exerting pressure for consolidating services at one regional airport. Tampa and St. Petersburg, the obvious contenders, each had roughly half the passenger business and half the major trunk lines. Tampa had opened a new terminal in 1952, and was in the process of expanding that and its runway facilities. St. Petersburg, in a major bid to become the sole regional airport, started a seven to eight million dollar project to provide a new terminal and improved runways. For reasons that are not entirely clear, the tide of competition turned in Tampa's favor in the late 1950's, as more and more major airlines opened services at its expanding terminal; but St. Petersburg continued development of its airport in hopes of reversing

the trend. The issue was settled in April, 1961, when the FAA decided that the regional commercial airport should be located in Hillsborough County.

Politics, opportunity and accident all played roles in this conclusion to the Tampa-St. Petersburg rivalry. In terms of convenience to users the contest was a stand-off. Located ten miles apart on opposite sides of Old Tampa Bay, the two airports were each about as close to the center of user density as geography allowed. But Tampa and the FAA had in mind the possibility of moving TIA some ten miles south, to the tip of Palma Ceia Peninsula that separated Hillsborough and Old Tampa Bays. This was and is the site of MacDill Air Force Base, then serving primarily as the home for a force of aging B-47 strategic bombers. An early decision by McNamara's regime at the Defense Department to speed the phase-out of the B-47, seemed to make MacDill available for conversion to civilian use. But the same Democratic ties that gave Hillsborough County an edge over Pinellas County also helped preserve MacDill as an active military installation. Hence TIA stayed in place, adapting its existing site to expanding operations.

Coping With the Air Travel Boom (1958-1972)- In 1958, having captured much of the region's commercial traffic for TIA, the HCAA Board also set about finding new planning and managerial leadership. Its first important decision was the choice of a new director to be the Authority's chief

administrator. In this choice, the HCAA Board probably had the benefit of advice from Leigh Fisher. Since World War II, Fisher had built Leigh Fisher Associates, Inc., of San Francisco (LFA) as a major national airport consulting firm. Fisher had done business previously with Tampa, and he knew well a large number of the emerging professionals in airport management. The Board's choice as new director was Herbert C. Godfrey, Jr., then manager of San Diego's Lindbergh Field. When Godfrey arrived in Tampa in December of 1958, he announced his intention to develop and improve TIA in accordance with plans suggested by Fisher. Godfrey spent over seven years in Tampa, and was the central public figure in planning for the development of a new terminal and other facilities at TIA.

Godfrey first set about a series of minor changes to the existing terminal, closing the area between its two sections, and moving and improving the baggage facilities. Simultaneously, he and the HCAA Board began to consider the possibility of a much larger terminal, to be located near the center of the airport tract between the two main north-south runways. Godfrey negotiated a consulting contract with LFA in mid-1962, to study requirements for the new terminal; and ten months later, in 1963, Fisher presented his preliminary report to the HCAA Board. Godfrey and Fisher tentatively sold the Board on the goal of incorporating radically new concepts into the terminal design, and persuaded the Board to give them

more time. A full design team was assembled, including Fisher and LFA; the J. E. Greiner Company of Baltimore and Tampa, consulting engineers; H. Leslie Walker and Associates of Tampa, architects; Thomas M. Sullivan, Port of New York Authority, architectural technical advisor; B. J. VanIgen and Company, Inc. of New York and Miami, fiscal advisors; and Herbert Godfrey as coordinator.

What seems crucial in retrospect is that the HCAA Board did agree to further planning. Passenger pressure on the existing facilities was mounting, and indeed became nearly insufferable during peak periods in the last years of the old terminal's operation. What the Board had in mind at the outset in 1962 was a fairly traditional new terminal, costing twelve to thirteen million dollars. What the Board ultimately approved, four years later, was construction of a new terminal according to the Godfrey-Fisher design, to cost forty-two million dollars, and to open in early 1969. Shortly after, in April of 1966, Godfrey resigned his post as Director of HCAA, to accept a vice-presidency with United Airlines in New York. (UAL has never operated in Tampa.)

By this time, the HCAA Board had undergone some significant changes. In 1955, Clyde Perry, a Roundtable nominee with two years' service, was elected chairman by the Board. In 1961, however, Democratic Governor Farris Bryant decided to extend the patronage power of his office. Refusing local advice from Tampa, he failed to reappoint Perry for a new Board term. Nonetheless, the Board elected yet another old member and Roundtable nominee,

Rudy Rodriguez, as its chairman. There was no more open interference in the traditional appointment until Republican Claude Kirk succeeded Bryant in 1967.

When Godfrey resigned, the HCAA Board turned to George Bean, who had been picked two years earlier by Godfrey to be the HCAA airport's manager. Bean had started with Northeast Airlines in 1947, and then had successfully managed airports in Worcester, Massachusetts, and Wilmington, Delaware, before coming to Tampa. Bean carried TIA through the construction and opening of the new terminal, and remains HCAA director today.

The new terminal did not open until April, 1971, about two years late. In the interim, Bean and the HCAA Board faced and surmounted three major threats to successful completion of the project.

One of these threats arose from Republican Governor Kirk's decision to make gubernatorial appointments to the Board a matter of his patronage, as his Democratic predecessor had done. While Kirk was in office (1967-1971) the Board developed a marked party split; the Tampa Mayor and the Hillsborough County Commissioner were traditional Democrats, while the three citizen appointees were all Kirk Republicans. One aim of the Kirk men was to uncover and expose what they charged was deep-rooted corruption stemming from Democratic dominance of city and county government. Nothing of any significance was discovered, but principal staff members and some Board members were subjected to time-consuming and much-publicized outside investigation. One staff member recalls that very little of any importance

was decided by the Board during this time. Nonetheless, Bean succeeded, as had Godfrey before him, in gaining and maintaining the Board's support for what was proving to be an increasingly costly project.

The second threat arose from rapidly rising construction costs, spurred by the Vietnam War inflation and compounded by a lengthy construction workers' strike. Cost of the terminal and related improvements, originally authorized at forty-two million dollars, rose to eighty-one million dollars by the time the terminal opened. The greater part of these funds were raised on revenue bonds. The HCAA chose not to use its statutory taxing authority (one and a half mils); but it did take the precaution of concluding a back-up agreement with Hillsborough County and the City of Tampa to underwrite operational losses. One current staff member recalls that the Board never balked at the rising costs, during either planning or construction. They only insisted that Godfrey, and Bean after him, stay within the financial consultants' expanding revenue estimates.

A third threat came from the resident airlines, who made their own contribution to rising costs. In a matter of weeks, just before ground-breaking at the new terminal site, the airlines changed their position on the new jumbo jets from "we'll never buy them," to "we'll buy them but Tampa will never see them," to "we want the new TIA terminal to accommodate them." This necessitated rapid and costly changes in the terminal's design

which, nonetheless, were incorporated without eroding the integrity of the Godfrey-Fisher concept. There were other airline challenges, as well, aimed at loosening the HCAA's authority over space assignment and decoration and signing. Bean, with the Board's support, successfully resisted these pressures.

Planning, Design and Construction of a New Terminal

By the end of 1961, nine months after the FAA's designation of TIA as the principal commercial airport for the Tampa Bay Region, annual passenger volume (enplaned and deplaned) had reached one million, and prospects were for continued growth. Planners at TIA had to consider not only the growing traffic volume, but also some special passenger characteristics. Traffic at TIA included an unusually large proportion of aged and infirm passengers, and seasonally it included a large proportion of tourists, arriving for or departing from long stays with large amounts of baggage.

The existing terminal, built in stages through the 1950's, was tucked into the southeast corner of the airport tract, and offered limited possibilities for further expansion. By 1962, the HCAA Board and management were actively considering the idea of building a new terminal, to be located near the center of the airport tract (between its two main north-south runways).

Under its consulting contract with TIA (1962-1963), Leigh Fisher Associates reviewed not only the specific needs at Tampa, but also the evolution of terminal designs nationwide. A digest of their report, prepared in late 1963, offers insights into their general findings and the direction that the new TIA terminal design was to take.*

The LFA report argued that physical design of an airport terminal complex must reconcile operational needs in three areas: airside (aircraft loading and servicing), landside (roadways, parking, and ground transport terminals), and a passenger collection point (passenger processing and services). Underlying the physical conflicts between these needs are both technical constraints and the interests of three parties to the terminal complex operations - the airlines, the airport management, and the passengers.

In the past, the LFA report continued, design compromises had been made primarily in favor of airside operations. Specifically, terminals had been designed to accommodate the increasing space requirements of larger and more numerous commercial aircraft; the airlines' desires to

*Basic Concept - Landside/Airside Separation: Digest of an Eighteen Month Investigation into Alternative Methods of Airline Airport Terminal Design Possibilities, prepared for Hillsborough County Aviation Authority (Tampa, Florida), by Leigh Fisher Associates, Inc., Airport Consultants, San Francisco, California, October, 1963. Persons principally responsible for the report were: Herbert C. Godfrey, Jr., for HCAA; and Marjorie Brink, Research Analyst; James C. Harrison, Planning Analyst; and Leigh Fisher, Special Consultant and Director of Analysis for LFA (short reference: LFA Report Digest, 1963).

conduct competition on the basis of separate, distinctively identified operational and passenger processing spaces; and the airport management's desires to route passengers past revenue-returning concessions. The result had been the evolution of airport terminal design toward increasingly elaborate variations on the original linear terminal. Landside facilities, in the absence of any spur from improved ground transportation, had emphasized improved roadways and expanded parking facilities. Relatively little attention had been given to the passengers' convenience, in terms of location of parking, disposal and collection of baggage, and intra-terminal movement from landside to processing to airside.

The report suggested two major areas of possible improvement in the design of a new terminal for TIA. First, by separating landside and airside facilities physically, it should be possible to design each to its own operational and financial constraints. In particular, the designs could take advantage of the much longer expected life of landside technology, as compared to airside technologies responding to more rapidly changing aircraft characteristics and needs. Second, the design should take more fully into account the convenience of the passengers at all points, from the entrance to the airport site to the aircraft gate.

The LFA report discussed various design features that might help to achieve these improvements. While recognizing that passenger collection could be physically combined with the airside facilities, most of the

discussion emphasized a central facility combining landside and passenger collection operations. This would include ground transport terminals, stacked automobile parking levels, passenger processing facilities, concessions (possibly including a hotel), and airport offices. Airside functions would be confined to several outlying structures of simpler construction. Finally, in what the report recognized as the major disadvantage to the scheme, some means would have to be incorporated to transfer passengers, baggage and cargo between the landside collection terminal and the airside facilities. Solving the passenger movement problem indeed proved the greatest challenge for the design team assembled in late 1963.

The design team was not certain that any innovative solution to designing a new TIA airport terminal complex would eventually receive HCAA's approval. Consequently, the team developed three different parallel designs during the period 1963-1965:

- 1) a terminal in which passengers would depend upon the transfer device for their travel between the central terminal core and the airside satellites;
- 2) a modification of the conventional terminal layout, shortening walking distances without the horizontal transfer device by piling landside activities on top of each other in a central terminal structure;
- 3) the conventional terminal, with concourse/parking lot "sprawl" and all.*

*Hillsborough County Aviation Authority, Tampa International Airport, A New Approach to Jet Age Terminal Development, Progress Report, 1961-1965, 1966 (short reference: HCAA Progress Report, 1961-1965).

Staff members now recall, though, that Godfrey and Fisher strongly favored the first, full-separation scheme, and that scheme was subsequently approved by the HCAA Board in January, 1966.

Godfrey, we are told, insisted on three criteria for his favored scheme: (1) that walking distance from parked car to aircraft be held to a maximum of 500 feet; (2) that the transfer system operate on straight-line routes; and (3) that the transfer system technology be as fully demonstrated as possible prior to design adoption. As implemented, the new terminal design somewhat exceeds the first criterion, with a maximum walking distance of 645 feet from parking to airside gate area. This compares favorably with minimum distances at most regional airports. The second criterion heavily favored a final configuration of the separation scheme, in which each satellite airside structure is connected to landside by a separate straight-line transfer system. Meeting the last criterion, that is, finding a well-developed transfer technology, offered the greatest challenge to the design team.

In their search for a viable transfer system, beginning in 1963 the design team considered at least sixteen different manufacturers. In mid-1964 they toured several systems at the New York World's Fair and visited two separate Westinghouse facilities in Pittsburgh. They then sent formal requests for proposals to three firms: Westinghouse Electric, Westinghouse Air Brake, and Stephens-Adamson Manufacturing. Of these, only Westinghouse Electric responded in full. This review process

considered a wide variety of systems, ranging from roller and roller-belt devices offered by Disney Enterprises and Stephens-Adamson, to monorails, to rubber-tired cars moving or towed on a conventional roadway, to the Westinghouse Electric system finally adopted, which employs automated, rubber-tired cars operating on a guideway.

Between approval by the HCAA Board and completion of the new terminal, several important features of the design were altered. The adopted plan called for auto parking on top of the airside structures as well as at landside. As constructed, the terminal offers structural parking only atop landside. A proposed remote drive-in, check-in system was omitted, and the airside facilities were adapted to accommodate jumbo jets.

After considerable construction delay, the new TIA terminal opened in April, 1971. A brief tour with hypothetical departing and arriving passengers will suggest the character of the terminal complex.

A departing passenger approaches the terminal complex from the south. He can be dropped off by car, taxi or limousine at the passenger processing (second) level of the landside terminal. Or he can park on one of three levels atop landside and descend to level two by elevator. Or he can turn in a rental car at ground level and take the elevator to passenger processing. At level two, he may check his baggage outside the door, or conduct ticketing and baggage business at a conventional airline counter inside. (A staff member proudly notes that even long ticketing

counter lines seem less stressful to waiting passengers, as carpeting throughout cuts down the interior noise.)

Checked in, and free of all but carry-on items, the passenger is directed to an escalator leading up to level three. Here he will find a full range of shops and restaurants, and truly comfortable lounge areas clustered around television consoles. Or he may proceed directly to the correct station at level three to board the transfer system.

For normal, automatic operations, the transfer system for each of four airside terminals consists of two cars riding on parallel elevated guideways. The passenger approaches through the landside entry lobby located between the ends of the two guideways. The cars depart landside and airside simultaneously, and the trip takes forty seconds; so there is little waiting time to board a car. Riders enter and leave the cars from opposite sides, so there is no struggle with counter-traffic. The cars have no interior seats, but ample rails and poles provide safe support. An automated address system instructs riders on each move.

At airside, the passenger is funneled through inspection, and then has a short walk and/or escalator ride to reach his gate. Here he is back in familiar airport surroundings, with conventional lounge areas and limited snack bar service available.

The arriving passenger has an equally short walk from the gate to the transfer system. To accommodate peak arrival periods, the transfer

system is designed to handle up to 840 riders per ten minutes in either direction. Reaching landside, the arriving passenger easily locates a two-story escalator (or stairs, or elevator) to take him down to ground (first) level. Here he will find a conventional baggage delivery system and access to ground transportation (or an elevator up to the parking levels). The exit road connects to an interstate highway, and thence east into Tampa or west, across the Bay, to Pinellas County.

The terminal complex is not particularly striking from the outside, but it is attractively landscaped. What amounts to an above-ground tunnel at the ground level passenger exit is relieved by fountains and plantings. The interior decoration of landside is interesting and in some instances dramatic. The carpeting throughout the landside pedestrian levels has proved remarkably durable, showing few signs of wear, spills or cigarette burns. (Delta Airlines chose terrazzo over carpeting for the airside it leased; the Delta station manager now wishes they had chosen carpeting.) Throughout the terminal complex, successful efforts were made to accommodate wheelchairs and reduce the strain on elderly and infirm passengers; even the restrooms are separated from the landside lobby by baffles rather than doors. In December of 1973 an airport hotel and office building opened, which can be reached either from its own ground entrance or by a passageway from the landside lounge (third) level. The overall effect is one of comfort and ease, quite unlike any other airport terminal we have seen.

Passengers using the TIA terminal do confront three problems, one continuing, the other two episodic. The continuing problem is signing. The lack of uniform direction signs at regional airports means that probably no two passengers will react to the same system of signs in quite the same way. Although the TIA design team contracted with a special consultant, the original system had to be changed soon after the terminal opened, and other changes have been made from time to time since. The system is not particularly complicated; but signing seems to be an art to which individual users react unpredictably.

A second problem, or set of problems, is associated with the transfer system. It is possible to operate the cars manually, though this is rarely necessary. It is also possible to reduce operations to one car per leg. This is done frequently to conduct maintenance or repairs on the second car, and it can have the effect of halving the carrying capacity at unplanned times. More serious, though much less frequent, is that both cars on a transfer leg may go out of service. The guideway structure includes a walkway that can be used in emergencies. But the most usual cause of complete breakdown is an electrical storm; these occur with exceptional frequency in the Tampa Bay area, and are usually accompanied by very heavy rains. Under such circumstances, no amount of umbrellas pressed into service can keep the walkers dry.

A third problem is the baggage service. Normally this is quite

prompt, helped along by the dedicated (reserved) roadways routed underneath the aircraft parking aprons. But in peak tourist periods, the baggage handling system can fall behind.

None of these problems, however, detracts from the traveller's usual experience at TIA of efficiency, convenience and lack of strain.

Current Operations, Problems and Prospects

Most aircraft operations at TIA are conducted on the two north-south runways (36R/18L, 8,300 feet, and 36L/18R, 8,700 feet). Landing and take-off maneuvers to the north of these runways cause little noise problem, as the area to the north is zoned for light industry. To the south of the western runway (36L) is Old Tampa Bay. But operations to the south of the eastern runway (36R) do impose noise pollution on a fairly well-to-do bayshore residential area. Thus, landings and take-offs on the eastern runway are normally limited to the northern approach. When the western runway is out of service, though, as it was for reconstruction during fall-winter, 1975-1976, some operations must be conducted over the southern approach to the eastern runway. An extensive public relations campaign served to hold complaints to a minimum.

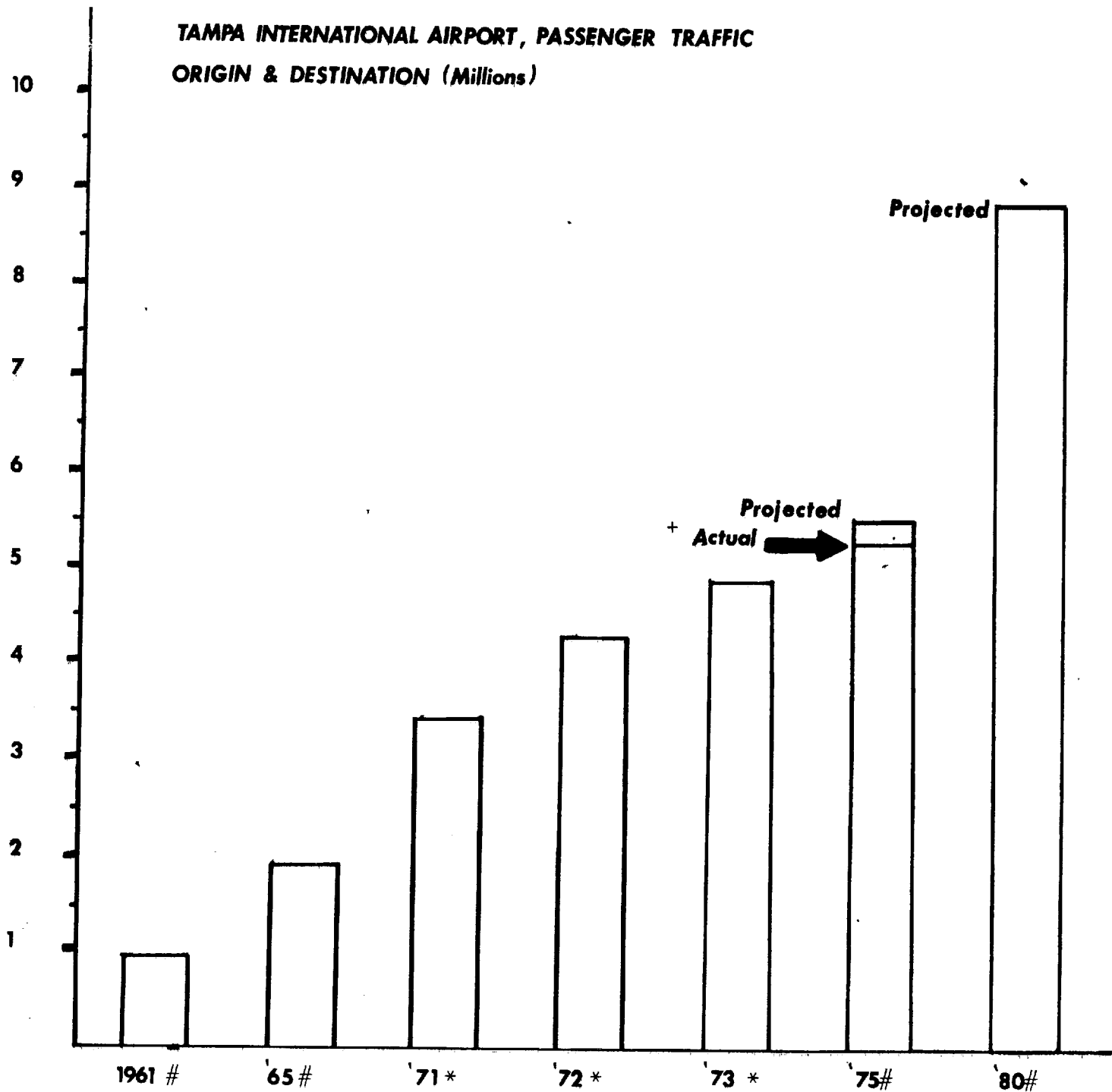
TIA also has one east-west runway (9/27, 7,000 feet) south of the terminal and crossing the eastern runway. To the west of that runway again is Old Tampa Bay. But to the east is an older residential area that is going increasingly commercial. Staff members recall that, after

jets were introduced to TIA, some homeowners won awards under reverse condemnation procedures.

In general, TIA causes little concern in the surrounding community over noise or other forms of pollution. Roger Stewart, the vigorous director of the Hillsborough County Environmental Protection Commission, did object unsuccessfully to the recent acquisition of a professional football team for Tampa Stadium, some two miles east of the airport. He argued that the added automobile traffic in the area would dangerously increase the periods of high air pollution. TIA got involved by offering use of some of its undeveloped parking areas for remote stadium parking. Even so, Stewart did not see TIA as a serious source of opposition on pollution problems.

Aircraft operations, averaging about 280 per day, have not yet seriously strained TIA's capacity for aircraft or passengers. Passenger traffic has continued its steady climb, except for 1974-1975. Unlike D/FW or St. Louis in the early stages of their airport controversies, Tampa has somehow avoided excessively optimistic traffic forecasts. In 1963, Leigh Fisher projected a traffic rise of 621,000 to 690,000 enplaning passengers in 1966. Actual origin-and-destination traffic for 1965 was 1,815,000, about fifty percent greater than the level projected by Fisher. The chart below shows the growth and expected growth of TIA traffic for 1961-1980.

**TAMPA INTERNATIONAL AIRPORT, PASSENGER TRAFFIC
ORIGIN & DESTINATION (Millions)**



F.A.A. and A.T.A. figures, as shown in E.E. Hogwood and R.B. Maguire, "Passenger Transfer System Will Take the Long Walk Out of Air Travel," Westinghouse Engineer, January 1969

* Hillsborough County Aviation Authority, Annual Report, 1973

+ Tampa Tribune, March 13, 1976, p. 7-B. Figures are for the twelve months through February 1976, and show an increase of 4.62% over traffic for the twelve months in February 1975.

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What is particularly striking is that actual 1975 traffic (March, 1975 to February, 1976) was only a little short of the projection for 1975 made in 1967, despite the impact of economic recession. HCAA staff members add that the TIA terminal can handle up to twice the current passenger traffic without major adaptations, although this would probably exacerbate peak-period problems. Moreover, should traffic increases justify the investment, the TIA terminal is designed to accommodate two more airside facilities like the four already operating.

The recent repaving work on the western north-south runway was necessary, HCAA staff says, because of unexpected deterioration since the runway opened in 1963. HCAA, they point out, originally built a thicker runway than FAA would then recommend and support. The repaired runway is even thicker (sixteen inches), and new runway and approach light-signalling systems have been added. Similar runway deterioration problems have been experienced at other major airports, these officials say.

In spite of its name, TIA has very little international traffic (five flights each way weekly), and no two-way direct international routes. Negotiations are currently underway to designate TIA as a co-terminal to relieve the heavy international traffic burden at Miami's overcrowded facilities. Community opposition in Miami to expanded or relocated facilities there suggests that the negotiations may succeed.

If so, Tampa will need better international airside facilities than those now available to Pan American, which uses the one TIA passenger gate that lacks jetway access to airside. If the using airlines would underwrite it, TIA would reserve a fifth airside for international service; but the current financial difficulties of Pan American make this seem unlikely in the near future.

Long-time Tampa residents have been slow to appreciate the achievement of HCAA and the TIA terminal design team. They tend to be more surprised than gratified by the favorable reactions of visitors to the area. There is no other public facility in the Tampa Bay Region that even approaches the TIA terminal in combining attractive design with effective use. A local architect still expresses mock disbelief that the architectural work was done by a Tampa firm. By and large, local residents are just grateful that the terminal works and, thus far, does not cost them tax money.

The closest to a critical view that we uncovered was offered by Professor Harold Allen at the University of South Florida's College of Business Administration. The Tampa business community, he says, is simply not imaginative or ambitious enough to realize the full symbolic potential of TIA. This was only partially confirmed by talks at the Greater Tampa Chamber of Commerce, where TIA and its hotel are looked on as strong assets. Still, we encountered no evidence of ambitious long-range schemes for community and business growth focused on Tampa's advantages as a center

for air and sea traffic - certainly nothing approaching the dreams in Dallas and Fort Worth of becoming a great center for world trade, or the early hopes in St. Louis that a new airport would spark rejuvenation of a decaying urban core.

Conclusion

TIA, with its new terminal, is a rarity for the 1970's - an immediately and continuingly successful techno-system serving the commercial air transportation needs of a large urban region. In assessing its success, it is difficult to separate the factors of fortuitous timing, shrewd planning, and stable institutions.

TIA needed a new terminal in the early 1960's. Had a conventional terminal been designed and built then, it would probably be adequate to traffic demand now and for the foreseeable future. That the new terminal was not planned to open until 1969 (with construction delays putting off actual opening to 1971) might indicate uncertainty and over-caution. But the HCAA Board's willingness to support a lengthy design period in order to pursue significant innovations suggests a different picture, that of a governing institution willing to live with current physical and technical inadequacies and willing to risk future failure on a large scale. Leigh Fisher commented, after presenting his preliminary report to the HCAA Board in March of 1963:

It's the first time in all my eighteen years in the consulting business that this has happened. Everybody wants a terminal right now, maybe yesterday. They define the problem and say "find the solution". Tampa has in effect reversed that procedure and told me to "define the problem" first. So, for the first time in my experience, I haven't been told to build something right now. I've been told to try to think this one out. It's extremely encouraging.*

Most importantly, the TIA terminal's success stands as a tribute to the design team, and especially to Leigh Fisher and Herbert Godfrey. Both proved able to put to work their long experience in airport management. Both tempered imaginative vision with caution over new technology, and, it would seem, with healthy skepticism about overly ambitious forecasts of traffic.

The present HCAA staff were all involved with the design and construction of the new terminal. They are proud of their success, but are not planning any striking new departures for the future. They also recognize that such a project would be much more difficult to implement now, given current trends in the economy, and given the recently developed political and legal constraints on clearing new projects for environmental impact. The current HCAA planner is not even certain that physical facilities like TIA's will be viable or necessary in the longer run, given possible developments in intra- and inter-city ground transport. But such developments lie in the still unforeseeable future. For now, the attitude

*Tampa Tribune, March 11, 1963.

of the HCAA Board and staff, and of the community they serve, seems to be to enjoy what they have accomplished.

CHAPTER SEVEN

St. Louis: Unresolved Conflict

Lambert International Airport, located seven miles west-northwest of downtown St. Louis in St. Louis County, is a small 1,800 acre airport serving a metropolitan area with a population of 2.4 million. It is generally agreed that Lambert Airport cannot serve indefinitely as the principal commercial airport for the St. Louis metropolitan area, but there is intense controversy focusing on two questions.

First, how long can Lambert serve the commercial air transportation needs of the St. Louis metropolitan area?

Second, what steps need to be taken now and by whom toward locating and developing a new commercial airport for the area?

Site Selection - Background of the Controversy

Both of the above questions are subsumed in one policy decision now sitting before the Secretary of Transportation. That decision is whether to approve or disapprove a formal application for construction of a new commercial air carrier airport for the St. Louis area, at a site between Columbia and Waterloo, Illinois, some nineteen miles south-southeast of downtown St. Louis. How that application came to be made in early 1972, and the fate of that application in St. Louis, the State of Missouri, the State of Illinois, and Washington, D. C. during the election year

of 1972, comprise the principal roots of the current controversy.

To understand the origins of the application for a new commercial airport for St. Louis on the Illinois side of the river, one must first understand something of the political demography of the St. Louis metropolitan area. The 1970 census shows a population for the St. Louis standard metropolitan area of about 2.4 million people. Of these, only twenty-five percent live in the city of St. Louis, itself. Another forty percent live in St. Louis County. An additional ten percent live in three more Missouri counties surrounding St. Louis County. And the final twenty-five percent live in two Illinois counties on the east side of the Mississippi River. Population trends over the past twenty years show St. Louis County (excluding the city), and the three additional Missouri counties, as the principal population growth areas in the metropolitan area.

In the past twenty years the City of St. Louis has gone the way of many other core cities in the nation's metropolitan areas. That is, the population is increasingly black and poor. The problems this raises for city governments and finances are exacerbated by the special state charter for the City of St. Louis given in the late nineteenth century, which completely separates the City of St. Louis from St. Louis County, and in the opinion of some political and legal historians, gives the city charter a standing in state law equal to that of the state's own constitution. This effectively prevents the city from expanding its tax base by annexation.

Party politics in the city of St. Louis have been solidly Democratic for decades. In St. Louis County and the other three outlying Missouri counties, party politics have more closely reflected the border state competitiveness in the State of Missouri in general, while elections in the small cities and towns of those counties have been technically non-partisan. Although down-state Illinois is traditionally Republican, politics in the two Illinois counties of the St. Louis metropolitan area show some greater degree of competitiveness. East St. Louis, the major city on the Illinois side, has the apparently deserved reputation of being an unrelieved urban slum, where political power is contested between corrupt conservative white Democrats and black Democratic politicians.

Lambert International Airport, although located in St. Louis County, is owned and operated by the City of St. Louis. By 1968 the conventional wisdom among airport experts and airport users in the area was that the life of Lambert was definitely limited, probably to 1980, or at most, 1985. The then mayor of St. Louis, A. J. Cervantes, apparently agreed with this conclusion, but he must also have concluded that construction of any new airport on the Missouri side of the river could only further stimulate the growth of the St. Louis metropolitan area to the west and southwest, away from the core of the city. From Cervantes's point of view, then, both the City of St. Louis and the State of Illinois should have a mutual interest in assuring that any new

airport for the St. Louis metropolitan area be located on the Illinois side of the river.

Two events in 1968 reflect this mutual interest. In May the Illinois state legislature appropriated \$50,000 to fund a site selection study for a new airport in the St. Louis region; and in November the City of St. Louis voters approved a revenue bond issue including \$100 million dollars for improving Lambert airport and \$70 million dollars to start a new airport.

In 1969 the City of St. Louis authorized an engineering firm to conduct an airport site survey for the city. The results of the survey were completed in August of that year, but were not released at that time.

The first official public expression of the joint effort toward a new airport by the City of St. Louis and the State of Illinois came in April of 1970. At a news conference on April 22, Mayor Cervantes and the Republican Governor of Illinois, Richard Ogilvie, announced their joint intent to create a single airport authority to construct and operate a new commercial air carrier airport on the Illinois side. Their plan, which they said had informal approval of the federal authorities and the airlines, was to construct the airport, to move all air carrier operations from Lambert to the new airport when the latter opened, and then to deed Lambert to the new authority for development as a general

aviation airport. Although no specific site for the new airport was announced at that time, the plan gained quick acceptance from the two major St. Louis newspapers, the Globe Democrat and the Post Dispatch, and endorsement from the local council of governments, the East-West Gateway Coordinating Council.

Governor Ogilvie and the Illinois state legislature acted quickly in the summer of 1970 to create the St. Louis Metropolitan Area Airport Authority (hereafter called the Illinois Airport Authority), and appropriate 1.5 million dollars for the Authority. From the outset, the Authority has consisted of five members appointed by the Governor of Illinois, with the first appointments made in August, 1970. The legislation also allows for the appointment of an equal number of members from the Missouri side, but only at such time as the new airport comes into operation and the Authority takes control over Lambert airport. The Illinois Airport Authority held its first meeting in October, 1970, and by the end of the year had authorized a final site selection engineering study and had appointed its executive director, Mr. Arven Saunders.

In February, 1971, the City of St. Louis released its 1969 site selection study, which suggested, among other possibilities, that "a site at Columbia and Waterloo in Illinois be given consideration for location of the new St. Louis airport". In May, the Illinois Airport Authority announced the results of its own site selection study, which

indicated a clear preference for the Columbia-Waterloo site, and the Authority formally applied to the Federal Aviation Administration for air space clearance over that proposed site. In June, the State of Illinois committed 15 million dollars of a 900 million dollar transportation bond proposal specifically for land acquisition at the Columbia-Waterloo site. In August the Illinois Authority held public hearings on the Illinois side, and it held similar hearings on the Missouri side in October. In January, 1972, the Illinois Authority filed formal application for federal airport aid with the Federal Aviation Administration.

Opposition to the Illinois Airport Authority's plan for a new airport at the Columbia-Waterloo site developed slowly in 1971. In March the Missouri state Division of Commerce and Industrial Development commissioned a study to look for alternative sites on the Missouri side. The results, published in August, indicated that two sites, one west and the other northwest of St. Louis, compared favorably to the Columbia-Waterloo site and would be closer to the users. In April, 1971, a group of Illinois residents in and around the proposed Columbia-Waterloo site formed an organization called HUSTLE (Help Us Save the Land and Environment) to fight the location of the new airport in their community. And in October, 1971, the McDonald-Douglas Corporation, whose home headquarters is located on the edge of Lambert Field, released its own in-house report, showing ways to get additional air traffic capacity

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out of Lambert Field. But it was not until 1972 that concerted opposition to the Illinois Airport Authority's plans developed.

By early 1972, two opposition points of view were gaining increasing, though hardly majority, support. First, there was growing skepticism on the part of a number of parties about the forecasts of aircraft traffic and passenger traffic on which the Columbia-Waterloo plan was being developed. These forecasts suggested that commercial air traffic in and out of the St. Louis region would grow about eight to ten-fold between 1970 and 1995. Second, there was increasing concern among a variety of persons and groups on the Missouri side about the economic implications of building and operating a new airport on the Illinois side of the river. In direct terms, there was concern not only about the loss of airport jobs from Lambert to an Illinois airport, but also about the opportunity costs to Missouri contractors and construction unions if the airport were built by Illinois contractors and construction unions. In indirect terms, there was growing disenchantment with the idea of refocusing and reshaping the growth of the St. Louis metropolitan area simply by putting its principal airport on the Illinois side.

These and other opposition points of view gained institutional expression in February, 1972, when Democratic Governor Hearnes of Missouri signed two new pieces of legislation. The first created a Missouri-St. Louis Metropolitan Airport Authority (hereafter called the Missouri Airport Authority), and required that all plans by any public body in

Missouri for new airport facilities be approved by this new state authority. The second bill authorized a referendum the following November among citizens of St. Louis, St. Louis County, and the three surrounding Missouri counties in which voters would express their preference between the following two statements:

- 1) I favor the use of Lambert St. Louis International Airport so long as possible and the construction of a new facility in Missouri; or
- 2) I favor the immediate construction of an area airport facility in the State of Illinois to serve the airline users in the greater St. Louis metropolitan area.

The intent of these two pieces of legislation was clearly to aid retention of the principal St. Louis airport on the Missouri side of the river. Whether by intent or default, however, no formal proposal has ever been made to replace Lambert airport with a new commercial air carrier airport on the Missouri side of the river. Instead, the strategy of opponents to the Columbia-Waterloo plan has been to focus attention on the possibility of improving Lambert airport so as to keep it viable past 1985 and, its partisans argue, even past 1995. Whether by design or not, opponents of the Columbia-Waterloo plan have been able to maintain a common front by focusing on prospects at Lambert and avoiding the possible divisiveness of disputes over one or another specific alternative sites in Missouri.

The Missouri Airport Authority met for the first time in March, 1972. On hand were the members authorized to be appointed by Governor Hearnes,

but none of the members which the legislation entitled the Mayor of St. Louis to appoint. The main product of the Missouri Airport Authority during 1972 was the Lambert-2000 expansion plan, made public in October. Lambert-2000 called for a land expansion of Lambert Airport to allow for the construction of a second major east-west runway, and argued that this and other major improvements would keep Lambert viable well past 1995.

Opponents of the Columbia-Waterloo site gained public support for their position well ahead of publication of the Lambert-2000 plan. The St. Louis Globe-Democrat reversed its editorial support and began to promote preservation of Lambert airport. Numerous candidates for public office on the Missouri side, previously favorable to Columbia-Waterloo or uncommitted, spoke out in favor of a Missouri solution. HUSTLE continued its operation on the Illinois side. In May, the Missouri Authority, St. Louis County, and the State of Missouri filed legal notice of opposition to any favorable decision on the Illinois Authority's application with Transportation Secretary Volpe.

Nonetheless, several factors favored the Illinois Airport Authority and its Columbia-Waterloo plan. Foremost among these probably was the conventional wisdom, still widespread in the St. Louis area, that Lambert airport could not last forever and indeed would cease to be viable within the plannable future. As important, at least for the short term, were the early start that the Illinois Airport Authority had in developing

plans for a new airport and the continued support through appropriations by the Illinois state legislature and Governor Ogilvie. Only slightly less important were the continuing public evidences of support by Federal Aviation Administrator John Schafer, and the apparent assumption within FAA that what St. Louis needed was a large commercial airport on the model of the one then being built at Dallas/Fort Worth. This FAA support was probably also strengthened by the confidence the agency would have in Arven Saunders, executive director of the Illinois Airport Authority, who was an old FAA man himself.

Despite these strengths, proponents of the Columbia-Waterloo plan could not get a favorable decision out of the Department of Transportation during 1972. This non-decision rested largely on political, rather than technical grounds. For one thing, Republican Governor Ogilvie, while campaigning for re-election, told a small meeting of supporters on the Illinois side of the St. Louis area that his plans for a new airport would in effect steal the airport and its jobs and its economic returns from Missouri and bring them to the Illinois side. Publicity given these remarks on the Missouri side served as a rallying point for opponents of Columbia-Waterloo and may have contributed considerably to the overwhelming vote in the November referendum in favor of Lambert and a Missouri solution to St. Louis's airport needs. According to Saunders, however, sometime in late summer or early fall of 1972, and well before the Missouri referendum,

the Illinois Airport Authority's application had reached Secretary Volpe's desk, ready for his signature with all of the necessary departmental clearances. And Volpe probably would have signed it, Saunders maintains, but for a decision made in the White House. That decision had little or nothing to do with St. Louis's airport needs, but a great deal to do with the hopes of the Nixon White House for adding a Republican governor in Missouri to its list of 1972 victories. Republican Governor Ogilvie in Illinois, so the reasoning seemed to be, was in no trouble at all, and he didn't need help from the Nixon administration in the form of immediate approval of the Illinois airport. So, the argument went, why should the administration make trouble for a potentially successful Republican candidate in Missouri by approving the Illinois plan? As it turned out the White House was only half right. Governor Ogilvie lost to Democrat Dan Walker in Illinois, but Christopher Bond did defeat Warren Hearnes, and Missouri got its first Republican governor in quite a long time. In the meantime, though, the Columbia-Waterloo plan was shoved well to the back of the burner in the Department of Transportation.

In early 1973 the St. Louis Airport Authority, which controls Lambert airport, released the results of an engineering study showing that the Lambert-2000 expansion plan was not feasible. A little later in the year the president of McDonald Aircraft Corporation suggested that any significant expansion of Lambert airport's land area might force him

to move his operations out of St. Louis. And in March the Federal Aviation Administration released an interim report favoring the Columbia-Waterloo site over others that had been studied, including the Lambert-2000 plan. Thus, the Missouri Airport Authority's first thrust toward a Missouri solution died within six months of its publication. But the idea of a Missouri solution did not die, and indeed gained new strength in 1973.

Much of this new strength stemmed from the St. Louis mayoral election in the spring of 1973. Mayor Cervantes, who had been an original party to the Illinois proposal, was replaced as Democratic candidate for mayor by John Poelker, who expressed doubts at several points during his campaign about the desirability of an Illinois airport. Almost immediately upon his election in April, Mayor Poelker ordered the St. Louis Airport Authority to cooperate with the Missouri Airport Authority in developing a master plan for Lambert airport. Shortly thereafter he formally withdrew the support of the City of St. Louis for the Illinois Airport Authority and its plan.

The remainder of 1973 and much of 1974 brought further maneuvering among the City of St. Louis Airport Authority, the Missouri and Illinois Airport Authorities, the airlines, city and state officials and congressional representatives on both sides of the river, the Federal Aviation Administration, and the Transportation Secretary's office. The principal fruits of this maneuvering were delay and two additional proposed studies

to be added to an already impressive collection of studies and proposals regarding airport needs in the St. Louis area. One study grew out of Transportation Secretary Brinegar's decision to review air traffic forecasts for the St. Louis region, a task he assigned to the consulting firm of Peat, Marwick, and Mitchell (PMM). At about the same time, the St. Louis Airport Authority, the Missouri Airport Authority, and the FAA reached agreement, with the reluctant concurrence of the Illinois Airport Authority, on a decision to conduct a full scale master plan for Lambert International Airport. The contract for this study was awarded to the Ralph M. Parsons Company. As the Parsons master plan study has gone forward, the Secretary of Transportation has continued to consult with Peat, Marwick, and Mitchell on a succession of issues regarding St. Louis airport needs.

Issues Currently in Dispute

The primary coordinator for the Lambert master plan is Mr. Ron Moore, who was hired from the Missouri Airport Authority by Mayor John Poelker after his election in March, 1974, and appointed acting Director of Planning and Engineering at Lambert. Moore, an engineer, had worked for the State of Missouri, but had not worked on airports before 1972. The master plan study was divided into four phases: (1) phase A, aviation traffic forecast; (2) phase B, evaluation of alternative development plans for Lambert; (3) phase C, layout plan; and (4) phase D, financial

plan. The FAA initially approved funding only for phases A and B. These were completed in early 1975 and the FAA then gave the go-ahead for the rest of the study. Although the report on the first two phases is in the public domain, copies were not available for collection in our archives. Nonetheless, we were able to gather sufficient documents and other information through interviews to help us identify the principal technical, socio-economic, and political issues currently in dispute.

Technical Issues - One major result of the Parsons study for the Lambert master plan and the PMM study for the Secretary of Transportation has been a significant reduction in the air traffic forecasts for 1985 and 1995 in the St. Louis area. The initial forecasts by the Illinois Airport Authority showed a ten-fold increase in air traffic between 1970 and 1995. Current forecasts by both Parsons and PMM now suggest only a four-fold expansion in commercial air traffic during this period. These much-reduced traffic forecasts have probably played as important a role as did political maneuvering in prolonging the decision by the Secretary of Transportation on the Illinois Airport Authority's application for the Columbia-Waterloo site. It should be noted, though, that it was only as a consequence of earlier political maneuvering in 1971 and 1972 that an earlier delay on this decision was achieved, which permitted the subsequent re-exploration and reduction of air traffic forecasts.

While there is general agreement by all parties to the dispute on

these reduced air traffic forecasts, nonetheless distinct and conflicting Missouri and Illinois positions have developed on three more technical issues regarding Lambert International Airport and its future. The Missouri points of view are expressed in the Parsons Company work on phases A and B of the Lambert master plan. The Illinois points of view have been expressed in the work of Arven Saunders and his associates in the Illinois Airport Authority, as they and their various consultants have tracked the Lambert master plan point by point. Both Moore at Lambert Airport and Saunders at the Illinois Authority seemed optimistic that the PMM studies for the Secretary of Transportation would support their particular and conflicting points of view.

At the technical level conflict focuses on three basic issues regarding the adequacy of Lambert International Airport over the next twenty years. First, can the highways northwest of St. Louis handle the growing airport and non-airport traffic in the area? Second, can the runways at Lambert be re-designed and can new air traffic control technology be installed in time to handle three to four times the present air traffic? And third, will airport noise levels rise so far as to require extensive and expensive land condemnation procedures around Lambert Airport? The Parsons master plan study suggests optimistically that all of these problems can be solved to keep Lambert viable through 1995. Saunders at the Illinois Authority feels that the PMM studies have raised serious questions on all three counts, and he insists that Lambert

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cannot meet St. Louis's needs past 1985. Ron Moore, speaking as an interested party but also as a relative newcomer to these technical questions, suggested twice in our conversations that answers to these three problems depend less on technical engineering analysis than on whether the respondent favors or opposes keeping Lambert open for the next twenty years or more.

Additional technical problems involving air space conflicts and new site preparation costs are not currently at issue in the Parsons and PMM studies. Nonetheless, they will come to the fore when and if it is decided that Lambert must be replaced as the principal commercial airport in St. Louis. The air space problem arises out of the common desire on all sides to retain Lambert as a general aviation facility should the commercial air carriers move to a new airport. Early in the controversy two sites were identified as possible Missouri alternatives to Lambert Airport, one at Darden and one at Smartt Field. From the point of view of land cost and distance from users, either of these sites would be competitive with Columbia-Waterloo. However, the Illinois Authority and John Schafer at FAA have both contended that a major airport at either of these sites would conflict with the air space necessary for extensive general aviation operations at Lambert. Ron Moore contests this view, arguing that the air space conflict problem is no more serious than that raised at, for example, Dallas/Fort Worth Airport, where two major runways parallel to each other are operated simultaneously. The FAA's

position on this is probably responsible for the Missouri Authority's early decision not to propose a specific alternative site on the Missouri side, for fear that the FAA would reject Darden or Smartt out of hand. Although a number of other Missouri sites have been looked into at one time or another over the past five years, the Missouri Authority seems to have given serious consideration to only one more - this one at Cedar Hills, southwest of St. Louis, about as far from the center of passenger origin as would be Columbia-Waterloo to the southeast. The major shortcoming of Cedar Hill lies in its topography and geology, which would entail much higher site preparation costs than would Columbia-Waterloo. These considerations suggest that there are some grounds, although far from definitive, for Arven Saunders' contention that a Missouri solution to St. Louis's airport needs would result in building a new airport some forty to fifty miles west of the city of St. Louis.

The issues of highway access, air traffic capacity, and noise are the most pressing technical issues now facing Secretary of Transportation Coleman in his need to make a decision on the Illinois Airport Authority's application. But the problems of air space conflict and site preparation costs lead inevitably to some socio-economic issues that the Parsons and PMM technical studies cannot resolve.

Socio-Economic Issues - Socio-economic issues in the current controversy are not as easy to define and outline as are the technical ones. In past

decades the growth of St. Louis as a major commercial, industrial, and transportation center has taken place west of the river. Many elements in the business community and the community at large would be content to see growth continue in this direction. On the other hand, there are those elements who argue that the proper future for St. Louis lies in regional development involving communities on both sides of the river, and in revitalizing the City of St. Louis as the true center of the region. Relocation of air carrier facilities from Lambert to some other site might well have some effect on the future direction and character of St. Louis's growth. But just what and how extensive that effect would be does not seem answerable. The original agreement between Mayor Cervantes and Governor Ogilvie was ostensibly based on the regional view and on the argument that an Illinois solution would contribute to the revitalization of the City of St. Louis. Mayor Poelker's formal withdrawal from that agreement has left the Illinois Airport Authority, Illinois officials, and the St. Louis Post Dispatch as the Principal public proponents of that point of view. Opponents of Columbia-Waterloo contend, on the other hand, that the future of the City of St. Louis depends much less on relocating its primary airport in Illinois than it does on the general quality, character, and unity of downtown leadership. This general issue and many specific related aspects of it were reviewed in detail in summer and fall of 1975 by a special Airport Issue

Committee created by the Regional Commerce and Growth Association (a recent regional replacement for what was the Greater St. Louis Chamber of Commerce). Members of this committee were selected from among the few prominent individuals in the St. Louis communities on both sides of the river who had not publicly committed themselves on either side of the airport dispute (see section on current developments below).

Political and Governmental Issues - Whether Transportation Secretary Coleman approves or disapproves the Illinois Authority's application for an airport at Columbia-Waterloo, there will remain a number of political and governmental problems to be resolved.

It is possible that Secretary Coleman will conclude that Lambert airport can be kept viable through 1995. If so, there would seem to be no reason to approve any application for a new airport at this time. The Illinois Authority and others have argued that even if a new airport is not built until after 1985, now is the time to select a site. Various proposals have been made for land-banking at the Columbia-Waterloo site, and there is a wide variety of pressures for this kind of a solution. Nevertheless, the FAA and the Department of Transportation have indicated that their interpretation of the statutes precludes any federal involvement in land-banking. While it is unlikely that the land at the Columbia-Waterloo site will remain available for an airport indefinitely, any decision to reserve that site for future use a decade or two hence will

require some new institutional solution between the states of Missouri and Illinois or other relevant authorities, one having stronger legal and political status as a regional institution than that now enjoyed by Illinois's St. Louis Metropolitan Area Airport Authority.

Finally, even if Secretary Coleman does approve the Illinois Airport Authority's application for an airport at Columbia-Waterloo, it seems highly doubtful that the Illinois Authority could maintain its claim to status as the regional airport authority. Although Mayor Cervantes claimed he had the authority under his city charter to enter into an agreement with the State of Illinois, the subsequent enactment of the Missouri Airport Law and later moves by Mayor John Poelker both point to the need for a new institutional solution, possibly involving an interstate compact, to govern future commercial and general aviation facilities in the St. Louis region.

Current Developments - Two important developments since our visit to St. Louis in August, 1975, reinforce the thrust of the preceding analysis and suggest that the interested parties are about to pass from the stage of intense controversy to one of partial but substantive progress toward meeting the community's airport needs.

In November, 1975, the special Airport Issue Committee of the Regional Commerce and Growth Association made public its findings and recommendations. The Committee trod carefully between the Missouri and Illinois position, and recommended that:

- 1) steps be taken immediately by the City of St. Louis, its Airport Authority, the airlines and the FAA to speed improvements at Lambert, with a view to keeping that airport viable for at least another fifteen years;
- 2) the FAA designate Columbia-Waterloo as the site of a new regional airport, without specifying any date for its development;
- 3) the State of Illinois undertake land-banking of the Columbia-Waterloo site, but postpone further master planning until the time for using the site is clearly in view;
- 4) the State of Illinois and the State of Missouri undertake needed changes in the powers and makeup of the existing Bi-State Development Agency, and, in cooperation with the City of St. Louis, take steps toward transferring jurisdiction over all airport operations, planning and development in the St. Louis area to that agency.

The Committee's report pleased few of the principals to the controversy, possibly the mark of a successful compromise in the making. Moreover, the Committee admitted that the Bi-State Development Agency, although created some years ago by interstate compact and in possession of authority to operate airports, is not currently strong enough or representative enough to take on the recommended tasks. Nevertheless, the Committee felt that it would be far easier to alter an existing compact than to achieve a new one.

In January, 1976, Transportation Secretary Coleman presided over a one-day public hearing in St. Louis, and promised a written decision within ninety days.

Conclusion

The controversy over a new airport for St. Louis affords interesting parallels and contrasts with experience at D/FW and at other regional airports.

Unlike our other cases, both St. Louis and D/FW exhibit intense public political conflict involving independent governmental units. At D/FW the controversy was resolved, at least for a time, when the FAA induced the cities of Dallas and Fort Worth to pursue a joint solution to their common regional airport needs. The two cities reached formal agreement on a site and created the D/FW Regional Airport Board to plan, finance, build and operate a facility on that site. At St. Louis, however, a planning institution was created by one state, Illinois; the Illinois Authority then selected a site and developed a proposal. That, in turn, spurred creation of a Missouri Authority and revived interest in lengthening the life of St. Louis's existing Lambert airport. The political dispute, ostensibly between Missouri and Illinois, has also divided the Missouri side of the greater St. Louis community. Quite aside from the relative technical and economic merits of the Missouri and Illinois cases, the crucial fact is that no viable institution has yet emerged that can respond

authoritatively to the region's long-term airport needs.

When and if such an institution is created, it may be able to avoid many of the problems now confronting the D/FW Airport Board. Both the long political dispute and the closely concurrent economic recession have led to extensive and conservative reassessment of airport needs in St. Louis, and all parties are aware of the difficulties that have plagued D/FW.

If no such institution comes into being to mark current resolution of the controversy, the likely consequence will be a rather half-hearted attempt to extend the useful life of Lambert Airport. The controversy would probably be resumed openly in another decade, by which time the alternatives available might be even less attractive than at present.

CHAPTER EIGHT

Conclusions

It must be clear from the preceding chapters that we found considerable variation among the regional airports we studied. Topographical settings, locations within the region, architecture, and technical support features differ widely. Yet the wide expanses that buffer them territorially from other activities in their regions, and the drama of their physical presences, tend to wash out perceptions of difference. They seem more of a piece than any one of them compared to a near city airdrome. They have more than technical purpose in common. They seem responsive to common public and elite urges. They are clearly techno-systems of the same species and of the same generation.

The regional airports appear similar because the regional airport concept is a manifestation of basic assumptions widely shared among those who have been actively developing them. Indeed, the same individuals appear in the development of several of the airports studied, and the design group for each airport project assiduously studied the design features of preceding airports. These studies ended in a choice of one or the other of two basic schemes: (1) a terminal cluster between parallel main runways, such as at Kansas City International and D/FW; or (2) a single landside terminal providing transport for passengers to airside aprons or docks, as produced at Dulles, Montreal and Tampa.

Moreover, these airports face common difficulties that are more than simple, direct consequences of comparable technical design. All are attempts to cope, some more successfully than others, with complicated problems that inter-relate and reinforce one another in ways that are not well understood even by the actors involved. These actors in regional airport development, design, construction and operation are driven, it seems, by their values and training and by social necessity, toward a basic optimism - an optimism founded in confidence that they can surely control and ultimately defeat periodic difficulties. Political officials, airport administrators, architects, design engineers, and airline executives all encounter unexpected, surprising consequences of their decisions, consequences often arising from optimism that is rather weakly founded on an understanding of social, political, economic and technical inter-relationships. Not surprisingly, they are capable of molding the future in the direction of their expectations, but their success is frequently episodic and rarely meets the demanding requirements of their expectations.

Two sets of needs and expectations underlie the drive to develop a regional airport. One is the desire, originally promoted by the commercial airlines and the FAA, to consolidate operations at a single facility within the region. Consolidation is sought by individual airlines because they seek to reduce overhead costs. Consolidation is advanced by the FAA and the airlines collectively, as they all endeavor to constrain interline

competition for passengers. The other side of the development drive is the desire for regional economic growth and advantage. The regional airport cause is taken up by community elites seeking not only direct but multiplier effects on business growth and development in their respective areas.

Consolidating commercial airline services requires heavy regional capital investment. In the eyes of those promoting the regional airport, this investment is more than justified by the expectation that the new facility will more than repay its cost. Consolidation will, they believe, improve the technical efficiency and financial well-being of the airlines themselves. And greater airline efficiency, coupled with attractive, up-to-date facilities, should inevitably attract even more passengers and, of course, more revenues. More than that, the new modern airport is to become a vibrant symbol of the community's present economic well-being and serve as a gateway to the region and its bright future prospects.

The drive toward airport consolidation requires regional support. Not all those involved in such a drive, and even less all the other affected regional groups and interests, share the same goals and values. Conflicts arise, both in selecting the site and in financing the new facility. Proponents of development, confident in their anticipation of high returns, seek to attract support and confound opposition by the very logic of their case - logic usually founded in optimism about growth and excitement over the symbolic, prestige-enhancing qualities of the

proposed facility. Thus the need for support and the desire for technical-physical-symbolic attractiveness combine to push the various actors in a common direction, namely toward a modern, exciting, dramatic, technically-intense regional air facility.

In the sections below, we review both the similarities and the distinguishing characteristics of the regional airports we studied, the decision processes that led to them, and the consequences of those decisions. The first section reviews the site selection process. Although details vary from region to region, in almost every case that process generated open and latent conflicts, and these in turn affected the design and execution of the airport project. The second section accesses the successive decisions involved in designing, building and operating the new facility, and analyzes the varying patterns of outcomes. In both of these sub-processes, it seems clear to us that there was very little to retard, and much to promote, the fundamental decision to produce a dramatic, innovative, technically-intense system.

Selecting the Site

Once the drive to consolidate regional commercial airline facilities begins, selecting the site might seem to its supporters to be a complicated but solvable problem in rational policy analysis. The solution would seem to require trade-offs among the capital costs of the land and of highways and utility lines connecting the airport to the surrounding

region, convenient access for air passengers and airport and airline personnel, air and ground safety constraints, nuisance and pollution impacts on the immediate vicinity, and indirect localized impacts on economic growth. Rarely, however, can the regional airport's supporters turn to a single decision unit empowered to settle these compromises according to its own or its immediate constituents' preferences. In one fashion or another, site selection decisions reflect the varying interests of airline executives, airport managers and governors, suppliers of ground transportation, landowners and realty investors, local governments and civic groups, potential contractors and construction unions, other major businesses and unions, potential or organized consumer and environmental groups, and governmental agencies whose responsibilities extend beyond the region. It is hardly surprising that the problem of site selection seldom yields to a single or dominant "best" solution. Nor is it surprising that site selection decisions often leave even the most intense and continuing interests - those of the airlines, the management, and the passengers - unsatisfied in substantial ways.

Consolidation of Airline Service

The regional airport is most often originally inspired by the airlines' desires to consolidate their operations at a single point. Such an example is clearest at Kansas City, Tampa, and St. Louis, where the consolidation of commercial trunk lines has been or will be complete soon.

Each of the other cases, however, offer an interesting and instructive exception to the rule. At Dallas/Fort Worth, a new intrastate carrier, Southwest Airlines, has thus far been able to avoid the intraline agreement and carry on a successful operation from Dallas's Love Field. So far, Southwest's resultant special advantage in the competition for the Dallas intrastate passenger market, has been protected by its status as an intrastate line, out of reach of the FAA, and by the fact that its major competitor, Texas International, is one of the smaller, weaker partners to the agreement consolidating trunk service at D/FW. Indeed, the situation would hardly be worth noticing were it not for the burden that D/FW's marginal revenue circumstance places on its using airlines. A more important exception is apparent at Dulles, which is not truly a regional airport in the sense heretofore discussed. That is, Dulles competes with both Washington National Airport and Baltimore's Friendship Airport in serving the Washington, D. C. region. Given Washington National's great advantage in passenger convenience, the only forces supporting extensive multiline use of Dulles are the FAA and its Washington Airport Authority, both of which are backed by federal governmental powers. The third exception, Montreal, reflects the power of extra-regional governmental authority in a different way. Here the Canadian Ministry of Transport has required the major line serving the region, Air Canada, to split its service between

convenient, close-in Dorval and the new regional site, Mirabel.

All the airports we studied are intended to serve technical needs in a metropolitan region. But those technical needs arise first from the desires on the part of the airlines and the FAA to consolidate air service. The region's need for a regional airport is, in this sense, thrust upon it from outside. The subsequent motivations of regional interest toward promoting or frustrating the establishment of a regional airport all stem from attempts to cope with this extra-regionally-inspired technical change.

Accessibility

The thrust toward consolidation and control of interline competition does not, of course, point readily to any particular site for the regional airport, but it does have the significant effect of dampening the pressure to locate it near the center of passenger population.

This downgrading of passenger convenience is apparent to some extent in each of the cases investigated. At D/FW considerations of passenger access, taken alone, would have placed the airport much closer to Dallas, rather than midway between the two cities. At Kansas City, the airport is located nineteen miles north of the downtown area, whereas the majority of users on both sides of the state line live south of the city's central districts. At Dulles, the Chantilly location was a poor third choice from the point of view of passenger convenience. At Montreal, the Mirabel

site is a long thirty-five miles from the city. At Tampa, a Pinellas County location would have better served a majority of users. At St. Louis, only the pressure of political controversy has delayed moving from a temporarily adequate airport that is very near the center of user population, to a new site twenty-one miles south; and continued controversy may yet result in a future regional airport even farther from the users.

Not surprisingly, siting regional airports some distance from their users results in higher costs in terms of ground access and, in some instances, in continuing difficulties with providing adequate public transport to the from the airport. The latter results are especially apparent in the continuing troubles with the Surtran limousine service to D/FW, and in the seemingly inevitable and unending disputes over taxi service and prices at all the airports. In no case, however, with the possible exception of Mirabel, have these problems been severe enough to inspire creation or extension of rapid transit service to the airports. That, and the failure of VTOL/STOL services connecting Dulles with other intra-regional air centers, suggests that quick technological fixes to the problems of access will not be readily forthcoming.

Land Availability and Cost

Land prices are a major factor in the relative capital costs of alternative airport sites. In at least two cases, however, it was possible

to treat this as a sunk cost, which led in turn to an obviously dominant solution. At Kansas City, land at Platte City had been purchased to subsidize TWA's maintenance operations more than a decade before the new regional airport was sited there. At Tampa, the wartime lease of Drew Field to the Army resulted in a postwar windfall to the City of Tampa in the form of a much expanded airport tract. In both cases, then, land for a regional airport was effectively "free", at least from the standpoint of those making the decision. At D/FW, by contrast, a similar opportunity to locate the regional airport at existing Carter Field was not seized, in large part because that site symbolized the bitterness of earlier inter-city battles over a regional airport.

Factors other than the direct cost of the land, of course enter into calculations of the capital costs of an airport site. These include, most importantly, the geology and topography of the site, which can have significant effects on construction costs, as well as the quality of highway, water, sewage, and power systems in the vicinity of the site. For example, the existence of an alternative site at Kansas City, five miles from downtown, seems to have been discounted due to its location on river bottom land and its likely need for additional flood protection measures. The added capital costs of utility connections at Dulles, occasioned by its great distance from densely occupied centers, led to later efforts to share those costs and facilities with nearby small

communities. And the cost of building and reserving a special access highway for Dulles remains a bone of contention in that region. At Montreal, the great distance to Mirabel has raised the possibility of future investment in a ground access system as costly as the airport itself. At St. Louis, one alternative site on the Missouri side has consistently been discounted because its topography and geology would require unusually expensive site preparation.

Safety, Nuisance, and Pollution Constraints

One safety constraint that has had a significant impact on regional airport siting is the FAA's rules on "air space". The rules seem fairly clear: an airport's air space normally is defined by a box centered on the main runways and extending horizontally five miles in each direction and vertically to infinity. Any overlap between this space and that of another airport must be the object of special agreement between the concerned airports over vertical control of aircraft entering the overlap. The general position of the FAA is that even small overlaps are to be avoided. Among the cases we have studied, this constraint has played an obvious role at St. Louis, limiting consideration of otherwise contending Missouri sites that happen to have air space conflicts with already existing airports.

Clearly the rules exacerbate the problem of avoiding conflict with general aviation, military, and other air space claimants in the region.

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In a slightly different form, air space constraints also affected the choice of Mirabel at Montreal. Here, alternative sites south of the city were discounted not only because the river raised the costs of access, but also because nearness to the Canadian-United States border would necessitate special landing and take-off arrangements.

Topographic features, natural and man-made, in the vicinity of a prospective site can offer threats to air safety, and hence constrain site selection. In none of our cases, however, did these add significantly to the problem of site selection, although ground safety risks associated with nearby dense residential areas have played an important role in several instances. At Tampa, residential density to the east of the airport, and the feasibility of zoning restrictions to the north, are factors favoring the north-south orientation of the main runways. Similar problems played a reinforcing role in decisions to move away from close-in airports in all our other cases.

Ground safety considerations have not been the only, or even the most important, reason favoring moves away from residential areas. In recent years increasing weight has been given to noise impacts in the siting of airports. Consideration of noise has, in fact, imposed two kinds of constraints on the location of regional airports. That is, in all cases except Tampa, it has seemed desirable to move the airport some distance from existing or probable future residential areas; and to hold future noise impacts to a minimum, it has seemed further desirable to

constrain future land use in the vicinity of the airport. In four of our cases, the approach to such buffering has been to locate the airport on a very large tract of land, which in turn has limited the availability and raised the cost of alternative sites. This was an important consideration, and added considerably to the capital cost at Dallas/Fort Worth, at Dulles, and at Mirabel, and it affected initial proposals for a Columbia-Waterloo site at St. Louis. More recently, however, the costs such solutions impose have led local officials to consider zoning restrictions as an alternative to ownership in order to preserve a buffer against noise impacts.

In all our cases except St. Louis, siting and construction of the new regional facilities was accomplished before any formal requirement for an environmental impact review was imposed. Our interviews did reveal wide consensus, however, that these new legal requirements will impose severe, perhaps prohibitive, constraints on any future re-siting of regional airports.

Although environmental considerations are increasingly important for airport supporters and planners, organized opposition by residents in the vicinity of a prospective airport has thus far vitally affected the siting decision only in the case of Dulles. Here, citizen opposition to the original preferred site at Burke gained significant and effective congressional support, forcing the FAA to abandon that alternative, despite a sizeable initial investment. At St. Louis, a local group at Columbia-

Waterloo formed to oppose an airport on that site; but perhaps because it ran counter to unorganized, albeit intense, local interest in land profits, this group seems to have played only a minor role in delaying the St. Louis decision. At Mirabel, local residents' opposition developed only after the fact. In general, it seems likely that residents in the area of a prospective airport will have to ally with regional or extra-regional environmental groups in order to protect their own vital interests. Neither self-organization nor alliance is easy, given the lightly populated character of most possible airport locations. However, now that there are well established regional and national groups willing to take up the environmental cause, local opposition before the fact may become an increasingly important factor in future airport decisions.

Economic Growth

Like the thrust toward consolidation of airline service, considerations of economic growth have played an important role in generating support for new or improved regional air facilities. In all cases, with the possible exception of Tampa, supporters have built their cases, at least in part, on promises of general economic growth or recovery for the region. This has been especially stressed at Dallas/Fort Worth, and to a slightly lesser degree at Kansas City, Montreal, and St. Louis. Even at Tampa the airport management has publicized some apparent impacts on community economic growth. Moreover, insofar as these promises are associated with

a much enlarged facility, they play at least an indirect role in limiting the number and location of alternative sites.

In some cases prospects of economic growth have also been conceived in specific intra-regional terms. The long battle between Dallas and Fort Worth over location of a common facility was fired in large part by competition between the two cities' business elites, and D/FW's final location on the county boundary between the cities is a strong symbol of the resolution of that conflict, a recognition that the airport must at least appear to serve each city's ambitions equally. Similarly, the long competition between St. Petersburg and Tampa was probably fueled more by business community rivalries than by direct pressure from prospective passengers for convenient access. At St. Louis, much of the Missouri-Illinois conflict has been shaped by conflicting expectations and goals for downtown revitalization, reinforced by specific conflicts between the interests of Missouri and Illinois-based contractors and unions. At Montreal, part of the public strategy in selecting the Mirabel site was to stress its potential contribution toward developing a section of the region marked by rural poverty.

Interestingly, we have uncovered no evidence that the new regional airports have had any strong impact on either the respective regions' comparative economic advantage vis a vis other regions, or on specific intra-regional patterns of growth.

Site Selection Controversies

The great diversity of values and interests affected by the selection of a site for a regional airport makes some degree of conflict nearly inevitable. An interesting question, then, is why such conflict did not escalate to major public proportions in some of our cases. A possible explanation may lie in the pre-existence of significant sunk costs, economic or political, that helped pave the way to quick and/or authoritative resolution.

At Kansas City, Dulles, Montreal, and Tampa, the institutional focus for resolving any dispute was clear from the outset; but at Dulles (although not at Montreal, the extra-regional character of the institution probably facilitated opposition to the initial site selection. Kansas City and Tampa also benefited significantly from prior investment in land, and at Tampa, in facilities. Conflict has been most intense at Dallas/Fort Worth and St. Louis. In neither of these cases was there any generally accepted institutional path to resolving the controversy. In St. Louis, at the outset proponents of a new airport heavily discounted the value of sunk costs in Lambert's land and facilities. And at Dallas/Fort Worth abandoning the sunk cost advantage of Carter Field was part of the price of resolving the conflict.

Even where site selection conflict does not achieve high public visibility, any one-time resolution of site selection is bound to leave

one or more sets of interests relatively dissatisfied. The seeds are sown for the eruption of future site-related controversies. As the planners-builders-operators face subsequent adversities - either those arising naturally from the problems to be solved or from misadventure or miscalculation - these seeds may generate still further difficulties.

Expectations of Regional Growth

As we have suggested, many local business elites, officials, administrators, airline executives, and design teams have been filled with heady optimism about the possible economic impacts of a large regional air terminal. Most have been disappointed in their attempts to find evidence to substantiate anticipated growth. Such impacts are difficult to isolate, particularly in a large urban area. Those looking for airport-engendered growth are often disillusioned, not so much because regional airports do not have multiplier effects, but rather because it is very difficult to measure exactly how the airport complex affects the economic city - the standard metropolitan statistical area.

Thus, observers are inclined to concentrate on performance vis a vis projections of airport activity as an indicator of multiplier effect. It is problematic whether airport performance, compared with expectation, is a valid indicator of developmental effect, but the fact remains that in nearly all the cases studied, actual achievement lagged well behind that promised.

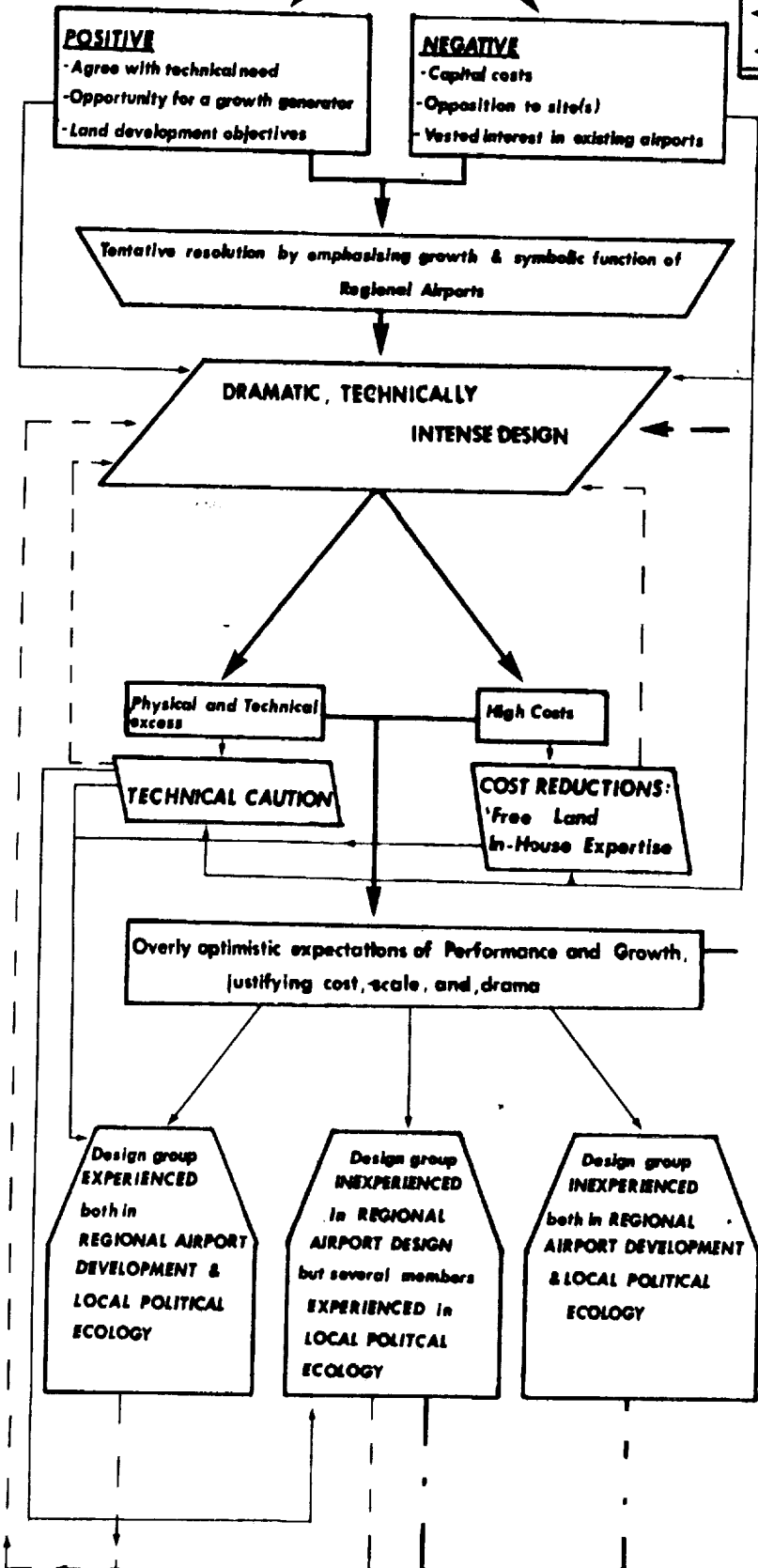
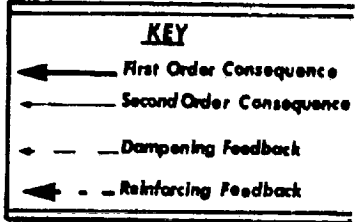
The Demand Forecasting Conundrum

The disjunction between promise and performance is more than merely the avenue for disappointment; it also results in physical and technical excesses, poor revenue to cost ratios, and subsequent political and administrative difficulties. If it is implicated in so many of the troubles experienced by those associated with design, construction, operation, and support of the regional airport, why, then, does the ubiquitous disjunction persist? There is no reason to expect that demand forecasting would lead to such pervasive difficulties. The trouble is that the forecasting techniques employed were rather simple and could be remarkably inaccurate, a fact that we found to be true in all but one case studied.

The projections for growth at Tampa International, though slightly optimistic, were considerably more accurate than those for the other airports investigated. There appear to be several reasons for this: sunk costs dampened the need for architectural drama and technical excess (see the chart below) and the design group was not inclined or pressured to justify an enormously costly new project by painting unrealistic pictures of the growth at TIA.

We found so many different forecasters to be wrong - and in the same direction - that it is not likely to be simply a manifestation of the technique itself. If the projections did not cluster so consistently on the high side of performance one might suspect that the cause was nothing

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F.A.A. & AIRLINES DESIRE TO CONSOLIDATE — EXTRA-REGION INSPIRATION



REGIONAL RESPONSE

PLANNING; DESIGN DYNAMIC

DESIGN GROUP INFLUENCES

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

more serious than faulty or unrealistic technique. Such is not the case, however, and we suspect that the structure underlying consistently optimistic projections is somewhat more complicated.

The cases we sketched in earlier chapters suggest the following hypothetical sequence. The tendency for conflict (and in the case of D/FW, Dulles, and St. Louis, bitter, long-lasting debate) leads the design group toward a heavy investment in the symbolic aspect of a new airport in order to make a statement that will build cross-cutting or unifying support for the project. Similarly, even in the absence of protracted conflict, the near-universal expectation that the airport will spur regional growth leads to technical and physical excesses, as the airport's promoters seek, and seem to need, the dramatic impact which they believe will attract activity.* This tendency to invest in symbolic purpose is further fueled by the airlines who also support dramatic, often expensive accessories in order better to differentiate their products from similar products marketed by others, and in this way attract a larger share of the commercial air market. We found that the airlines are all very concerned that they be able to establish a unique identity in the

*We are using "excess" here in the context of that support capacity necessary to comfortably and adequately perform the air to ground to air transfer function. Thus, soaring glass-encrusted terminals, chrome, carpets, colors, and computer-controlled people-movers, for example, are embellishments on the basic theme; they go beyond meeting the simple or actual needs.

airports. They resisted passenger-oriented designs like those at Tampa, Dulles, and Montreal because the separation of airside and landside facilities does not permit an airline adequate opportunity to distinguish itself sufficiently from its competitors.

In sum, then, we find that investment for largely symbolic purposes may add considerably to a project that is already expensive in its simplest form. Adding to high costs necessitates very optimistic growth or demand forecasts to justify or "sell" the complete package, which then the community elite and design group hope will "pull" the present toward that projected future. Moreover, the drive toward unique structures and support technologies can easily subdue lesser concerns, such as operating convenience, passenger comfort, and so forth.

Thus, we are compelled to conclude that excess capacity in terms of structure and technologies results in spite of flexible designs because forecasting responds to the aforementioned "pull" of symbolic purpose. This method is not likely to change until forecasts can be separated from their present function - the justifying of large, dramatic, and expensive construction. The day is approaching when analysts must begin to think about the costs of symbolic purpose and discount accordingly, just as the individual consumer must consider the extra cost and/or advantages of a Cadillac over a Chevrolet. The increased cost of the Cadillac may be worth the extra payment, but the wise consumer knows at least how much more

he is paying, why he is paying it, and exactly what he can expect back from this marginal increase in his investment.

Design Decisions

In view of our analysis thus far, one well might ask just how much choice is there in the design of those regional airports we studied? Our research rather strongly suggests that in the broadest sense there is very little choice, particularly in the decision to be dramatic and innovative. The evidence indicates that the imperatives to architectural drama and technical intensity are more numerous and stronger than those which would lead to different outcomes, imperatives such as low capital costs, adaptability, and simplicity, to name but a few.

This is not to say that there are not important differences among the airport designs, differences which result in diverse experiences for airport administrators, local officials, the airlines, and users. We find that, though each design team was pressed to develop an impressive facility, the character of a particular design group seemed to correlate with variable technical responses to similar stimulæ.

If the members of the design group were, for the most part, experienced, in-house professionals who were personally connected to other elites in the region and had learned to understand and operate effectively in the area's political systems, the resultant design reflected relatively less concern for dramatic statement and more for the particular needs of

the region's users. Thus, in Tampa, for example, we found that the facility was the least dramatic of the six; but the designers at TIA had not relied on overly simple, optimistic projections of demand growth, and as a result TIA had the best revenue/cost situation of any facility studied. So too, TIA was among the most flexible, least technically sophisticated designs and had experienced the fewest operating problems. In sum, it appears that the backgrounds of the people on the design team have considerable impact on the outcome, in spite of strong pressures to adopt a maladaptive solution.

The second kind of group differs from the first in that it is a new team, one not so experienced in the particular project at hand, that is, the development of regional airports; but they do know and understand the local political environment. Thus this group is legitimate from the local point of view, but the members of the design team feel pressure to prove themselves to the larger, relevant professional communities. The result is frequently that the needs of the local users are considered and fairly well served, as they are by the more experienced group, but the need to make a dramatic, technically intense facility, a need strongly reinforced by external dynamics, is emphasized more by the inexperienced group. Under these conditions we find our most creative examples, Dulles and Mirabel, which, though very dramatic, are nevertheless quite flexible and well-attuned to passenger needs. The dramatic facilities have their price, however. They are very costly,

and must be justified by optimistic growth forecasts, thereby virtually assuring that actual revenues will lag well behind expected returns.

The third case is the most painful in that it is maladaptive. In this situation, we find an inexperienced design team that is not established in the region's political systems and has not proven itself technically. In response to the very real need to prove itself competent, it most nearly approximates an organization serving strictly technical objectives. If we may use a spatial analogy - the first two groups are reasonably close to one another in their methodology, while groups in the third category are rather distant from both of the first groups in terms of their reinforcing effect on the scale, technical intensity, and striking characteristics of the project.

The first two groups tend to emphasize user and operating needs more than technical criteria, or at least emphasize them equally. The third group commonly loses sight of user and operating objectives, which become more and more displaced by technical criteria that logically should be subordinate to such ends. Therefore, as a result of this goal displacement process, the problems experienced by a facility designed under group three conditions, are likely to be pervasive, many-faceted, and of critical proportion.

In this category one finds the larger, more dramatic, most technically sophisticated, least flexible, highest cost facilities. Revenue lag

and passenger dissatisfaction may at times present overwhelming problems for the airport administrators. Operating problems, which are often costly to solve, add to revenue/cost imbalances and to widespread feelings of dissatisfaction with a given facility.

We are only beginning to understand the interactive nature of the policy making and design processes. Our research has strongly suggested to us that these processes influence one another in ways that are not well comprehended by the participants. These reciprocal relationships have an impact on the shape of large, socio-technical systems like regional airports, and we have attempted to trace some of these impacts. Furthermore, if the participants fail to recognize the dynamic nature of the processes, and assume, for example, that they are simple, straightforward sets of problems, the consequences for both the technical and political success of the project may be surprisingly unpleasant.

If both the policy makers and technical specialists better understand their relationship to one another they can act to emphasize positive interactions and reduce the negative. Depending on local objectives, officials can more intelligently recruit design groups and better recognize what to expect of their product. We have "state of the art" technical capacity for much better projections than those used by most of the design groups for the airports investigated. Clearly, if local officials were to insist on better forecasting techniques, many subsequent difficulties -

including unhappy revelations - would be mitigated or avoided altogether. Still, it is well to remind ourselves that no projection, no matter how sophisticated the technique, can be better than the assumptions which underlie it.

We have argued that there tend to be, in the policy making and designing dynamics, strong incentives to assiduously avoid the most realistic forecasting possible. However, as many of our interviewees noted, costs for regional airports are now sufficiently exorbitant that the rewards for accuracy and realism are nearly as strong, perhaps stronger, than the inducements to be overly optimistic in regard to growth.

INTERVIEW SCHEDULE

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KANSAS CITY

Jack P. Avery, Burns and McDonnell Consulting Engineers
Ilus Davis, Attorney-at-Law and former Mayor of Kansas City, Missouri
Jim Fisher, Aviation Editor, Kansas City Star
Robert Hurst, City Development Department, Kansas City, Missouri
J. Hampton McDowell, Director of Transportation, Mid-America Regional
Council, Kansas City, Missouri
Brenton D. Myers, Assistant Director, Planning Development and Engineering,
Aviation Department, Kansas City, Missouri
R. Bruce Patty, AIA, Patty Berkebile Nelson, Architects
Sam Vaskov, Properties and Facilities Director, Trans-World Airlines
Frank Willoughby, Deputy Aviation Director, Kansas City International
Airport

DULLES

Lamar Guthrie, Chief of Airports Division for the Federal Aviation
Administration in the Department of Transportation
David Hess, Public Affairs Officer for the Federal Aviation Administration
in the Department of Transportation
John Kerr, Acting Manager, Dulles International Airport

DULLES (Continued)

Ron Lewis, Assistant to Finance Officer for Dulles International Airport

David Saphalo, Assistant to the Manager, Dulles International Airport

James Wilding, Deputy Director, Washington Metropolitan Airport Service

MONTREAL (MIRABEL)

Robert Arbique, Superintendent of Airport Operations (Mirabel)

Benoit Beribeau, General Manager, New Montreal International Airport Project Office

Andre J. Bellemare, Director, Airport Operations and Services (Mirabel)

Dennis Boissy, Public Relations, New Montreal International Airport Project Office

John Cyr, Marketing and Commercial Services (Mirabel)

Vic Davidson, Public Relations Director, Airtransit Canada (STOL)

Alex Demetrakis, Operations Office, Air Canada

Kubin Genzberg, General Manager (Mirabel)

Michael Kinnaird, Superintendent, Reception Services (Mirabel)

Jean La Riviere, New Montreal International Airport Project Office

R. E. Springett, Aerodromes Superintendent, BOAC

S. Stein, Architect, New Montreal International Airport Project Office

TAMPA

- Harold Allen, Professor of Business Administration, University of South Florida
- George J. Bean, Director, Hillsborough County Aviation Authority
- Earle Bruck, Station Manager, Braniff International, Tampa International Airport
- Charles T. Carey, District Manager, Eastern Airlines, Tampa International Airport
- James C. Harrison, Assistant Vice President, Greiner Engineering Sciences, Inc.
- C. N. Jones, Jr., Station Manager, Delta Airlines, Tampa International Airport
- Louise Lagette, Librarian, Tampa Tribune and Times
- Paul T. MacAlester, Director of Information, Hillsborough County Aviation Authority
- Robert B. Maguire, Director of Planning and Development, Hillsborough County Aviation Authority
- John E. Probst, Director, Pan American World Airways, Tampa International Airport
- James D. Seale, Chief, Air Traffic Control Tower, Federal Aviation Administration, Tampa International Airport
- Roger Stewart, Director, Hillsborough County Environmental Protection Commission
- Norman H. Thompson, Jr., Executive Administrator, Tampa Bay Area Rapid Transit Authority
- Stephen Taylor, Chamber of Commerce of Greater Tampa
- Jim Trezevant, Chairman, Hillsborough County Aviation Authority

ST. LOUIS

James A. Dzierwa, Administrative Assistant, Missouri-St. Louis Metropolitan Airport Authority

Ronald J. Moore, Assistant Director for Planning and Engineering, St. Louis Airport Authority

Arven H. Saunders, Executive Director, St. Louis Metropolitan Area Airport Authority

Gail L. Stubbs, Administrator, Missouri-St. Louis Metropolitan Airport Authority

Thomas P. Walsh, Director for Transportation, Government Affairs and Community Development, St. Louis Regional Commerce and Growth Association

Sara Wilson, Director, Regional Forum, East-West Gateway Coordinating Council