ANALYSIS OF THE MARKET
FOR FLIGHT PLANNING SERVICES

FOR

UNITED AIR LINES
)MPUTER AND COMMUNICATIONS SERVICES DIVISION

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AUTHOR

Market for Flight Planning Serv.

TITLE

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FOR

UNITED AIR LINES
COMPUTER AND COMMUNICATIONS SERVICES DIVISION

FEBRUARY 15, 1976

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UNITED AIR LINES

FLIGHT PLANNING CONTRACT

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I. INTRODUCTION

Definition

Flight planning is that activity which has as its goal the selection of a particular route, altitude, speed, fuel consumption, and time required to get a particular aircraft with a given load from one point to another at a particular time. One or more flight plans may be prepared for each flight. The plans may be selected on the basis of minimum fuel usage, minimum time track, maximum payload, minimum overall cost, or any other criteria which suit the operating philosophy of the airline. In all cases, the most current weather information available to the system is used to compute the various optional plans. The final plan is often selected by the flight personnel, although the plans may be prepared manually, on an in-house computer, by a computer service company, or may be canned plans available from ATC/FAA.

Description of Interview Program

- This study of the market for automated flight planning services was performed by INPUT during the period between November 1975 and February 1976.

- An initial meeting was held at UAL in Chicago on November 19, 1975, to define the questions to be addressed in the study and the interview procedures. The meeting included Peter Cunningham from INPUT, and Ralph Boester, Gail Seidel, Ed Magni, Harry Gelling and Andi Radzvickas from UAL.

- The preliminary questionnaire was reviewed between Herb Seidman of INPUT, and Karen Burke, Harry Gelling, and Andi Radzvickas of UAL, by phone, on December 5, 1975.

- The following week the final questionnaire was mailed to UAL, and 114 questionnaires were mailed to foreign airlines.

- An interim report, which primarily summarized the answers to 14 questionnaires was sent to UAL and discussed by phone on December 23, 1975. As a result, some constructive modifications were made to the questionnaire as used in the remaining telephone interviews.

- The interview program target was for 50 domestic and foreign interviews with airlines flying two or more jet aircraft, particularly those flying segments greater than 350 miles. Domestic (including Canadian) interviews were to be done by phone, and foreign interviews were to be done by mail.

- Actual respondents are listed in Exhibit I-1, and include:

U.S. and Canadian Airlines:	40
Foreign Airlines:	15
Total	55

EXHIBIT I-1

LIST OF INTERVIEWS
(Domestic)

	Interview Number	Airline	Phone	Mail
1	001	Aircraft International	X	
2	002	Alaska Airlines	X	
3	004	American Airlines	X	
4	005	Braniff International	X	
5	007	Delta Air Lines	X	
6	008	Confidential		X
7	009	Flying Tiger Line	----Declined----	
8	010	Frontier Airlines		X
9	011	Hughes Airwest	----Declined----	
10	012	National Airlines	X	
11	013	North Central Airlines	X	
12	014	Northwest Airlines	X	
13	015	Ozark Air Lines	X	
14	016	Pan American	X	
15	017	Piedmont Airlines	X	
16	018	Seaboard World	X	
17	019	Southern Airways	X	
18	020	Texas International Airlines	X	
19	021	TWA	X	
20	023	Western Air Lines	X	
21	024	Capitol International Airways	X	
22	025	Overseas National Airways	X	
23	027	Trans International Airlines	X	
24	028	World Airways	X	
25	029	Air California	X	
26	031	Southwest Airlines	X	
27	033	Transair Ltd.	X	
28	034	Nordair Ltd.	X	
29	035	Air Canada	X	
30	036	CP Air	X	
31	037	Pacific Western	X	
32	038	Quebec Air	X	
33	039	(Johnson)Evergreen Intl. Airlines	X	
34	040	McCulloch Intl.	X	
35	041	Executive Jet Aviation	X	
36	042	Federal Express Corp.	X	
37	043	SMB Stage Lines	X	
38	044	Hawaiian Airlines		X
39	045	Summit Airlines	X	
40	047	Tricon, International	X	
41	048	Air Wisconsin	X	
42	051	Ranger Air Cargo	X	
43	054	Wien Air Alaska		X

EXHIBIT I-1, continued

(Foreign)

	Interview Number	Airline	Phone	Mail
1	101	Air France	X	
2	102	Cathay Pacific Airways		X
3	103	Ariana Afghan Airlines		X
4	104	Malaysian Airline System		X
5	105	Brittania Airways		X
6	106	Japan Air Lines		X
7	107	SAS		X
8	108	Icelandic Airlines		X
9	109	Kuwait Airways Corp.		X
10	110	TOA Domestic Airlines (Japan)		X
11	111	Finnair		X
12	112	Aerovias Nacionales de Columbia		X
13	113	Transair Sweden AB		X
14	114	South African Airways		X
15	115	Air Siam		X
--	---	Aer Lingus (did not complete questionnaire)		X

- In addition, mail, phone, and on-site interviews were to be attempted with all known flight planning services vendors, to establish a competitive profile. Known competitors are listed at the end of Exhibit I-2.

Characteristics Of Respondents

- Interviewees were selected with the purpose of segmenting the airlines industry into several groups:

  - Large CAB certificated U.S. Air Carriers
  - Smaller CAB certificated U.S. Air Carriers
  - U.S. Supplemental Air Carriers (members of the National Air Carrier Association)
  - U.S. Intrastate, Commuter, Mail, and all other scheduled air services, including members of the National Air Transportation Association and/or the Commuter Airlines Association.
  - Air Taxi and Commercial Operators

  Within these groups airlines that are mainly passenger service were selected as well as those which are mainly cargo carriers.

  - Canadian Airlines
  - Foreign Airlines (other than Canadian)

- The responding airlines have been allocated to each group, as identified in Exhibits I-2 and I-3.

Response Success

- Response to the survey was unusually successful. Using the World Aviation Directory as a guide, U.S. and foreign airlines were selected according to criteria set down by UAL, yielding potential of 49 interviewees. Results were as follows:

Telephone Interviews completed	37
Mail Interviews completed	3
Confidential response completed	1
Declines to participate	3
Mail interviews outstanding	4
Strike; personnel not available	1
Total	49

- Thus, the successful response rate from U.S. and Canadian airlines is 43/49 = 88%.

- Of the 114 questionnaires mailed overseas, a response of about 10 was hoped for, and 15 were actually completed and returned (13%).

EXHIBIT I-2

CLASSIFICATION OF AIRLINE RESPONDENTS

Large CAB Certified U.S. Air Carriers	Status*	Number of Flight Plans (1975)
Alaska	RDS	144,000
American	I	375,000
Braniff	I	120,000
Delta	I	234,000
National	I,E,PA	130,000
Ozark	C	108,000
TWA	I	584,000
Western	SEW	150,000
Pan American	I	128,000
Total.....9		1,973,000

Smaller CAB Certified U.S. Air Carriers	Status	Number of Flight Plans (1975)
Passenger		
Frontier	C	45,000
Hawaiian	M	------
North Central	N	------
Northwest	I,M	15,000
Piedmont	SCP,E	24,000
Southern	SEW	20,000
Texas International	C	26,000
Wien Air Alaska	M	1,100
Sub-Total.....8		
Cargo		
Airlift International	S	6,000
Seaboard World	L	------
Sub-Total.....2		
Total.....10		

* For status code, see type of automation and vendor code at the end of Exhibit I-2.

Exhibit I-2, continued....

U.S. Supplemental Air Carriers	Status	Number of Flight Plans (1975)
Capitol International	C-SEW	7,000
Johnson Flying Service (Evergreen)	M	1,000
McCulloch International	UAL	400
Overseas National	RDS	6,000
Trans International	UAL	96,000
World	M	5,000
		115,400
Total.....6		

U.S. Intrastate, Commuter, Mail and Other Scheduled Service	Type	Status	No. of Flight Plans (1975)
Air California	Intrastate Passenger	N	29,000
Air Wisconsin	Commuter	M	14,000
Federal Express	Mail, Cargo	M,C	------
SMB Stage Lines	Mail, Commuter	SCP	54,000
Southwest Airlines	Intrastate Passenger	M,SCP	------
Summit Airlines	Cargo, Commuter	SCP	------
Tricon International	Cargo, Commuter	SCP	------
Total.....7			

Air Taxi and Commercial Operators (Non-Scheduled)	Status	Number of Flight Plans (1975)
Executive Jet Aviation	N	------
Ranger Air Cargo	UAL	------
Total.....2		

Canadian Air Lines	Status	Number of Flight Plans (1975)
Trans Air Ltd.	RDS	17,000
Nordair	I	8,500
Air Canada	I	100,000
CP Air	I	28,000 (automated)
Pacific Western	UAL	61,000
Quebecair	M,UAL	1,000 (automated)
Total 6		

Exhibit I-2, continued.....

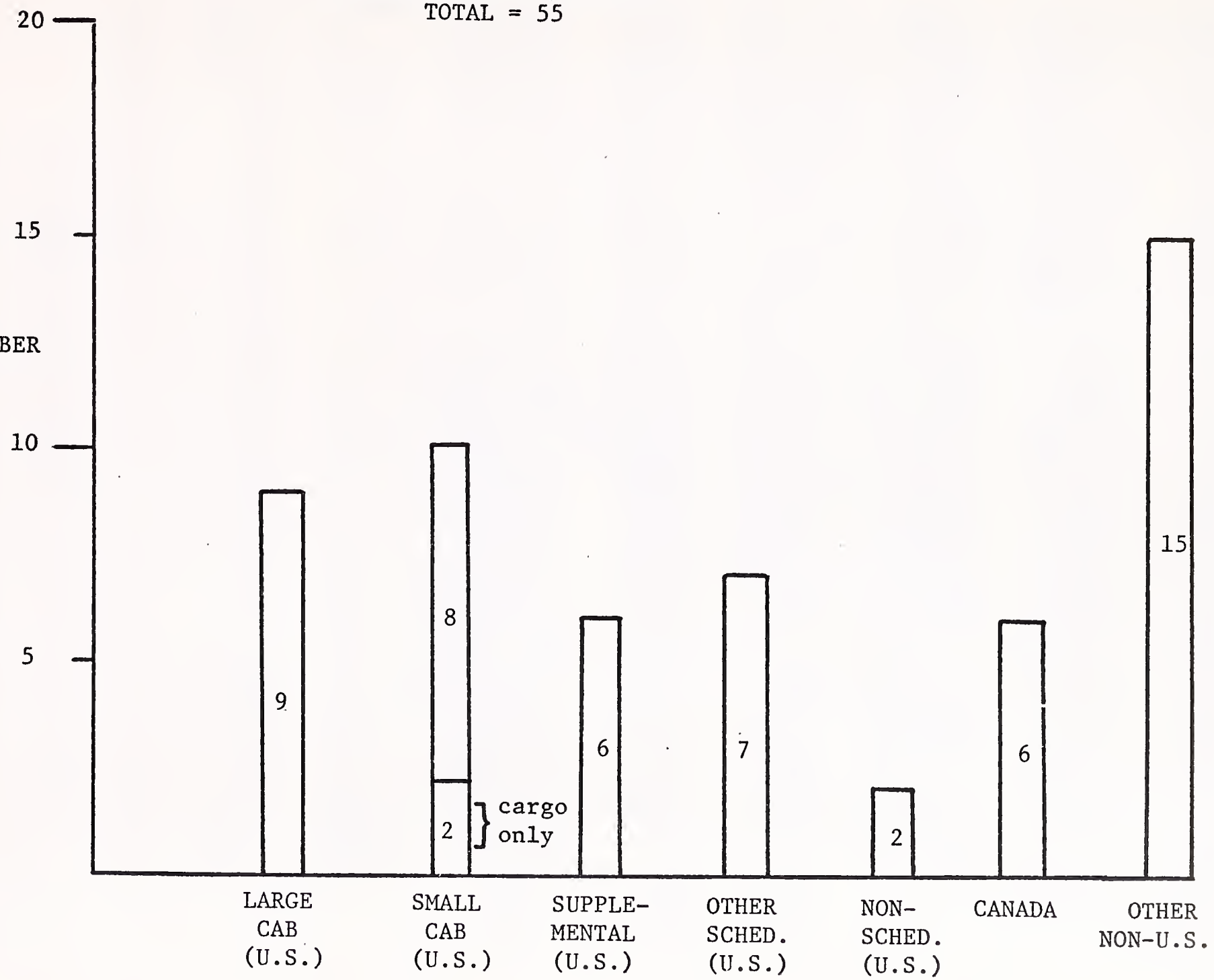
Foreign Airlines	Status	Number of Flight Plans (1975)
Air France	I,SAB	8,000 (+)
Aerovias Nacionales de Columbia	M,PA,RDS	120
Air Siam	M,C,JAL	1,300
Ariana Afghan Airlines	I,M	2,500
Brittania Airways	M	-----
Cathay Pacific	M	22,000
Finnair	M,RDS	11,000
Icelandic Airlines	RDS,M	2,800
Japan Air Lines	I	------
Kuwait Airways	M,I	------
Malaysian Airline System	M,Q	1,000
SAS	RDS	------
South African Airways	M	38,700
TOA Domestic (Japan)	M	4,000
Transair Sweden AB	M	4,000

Total.....15

Type of Automation & Vendor Abbreviations

AF	Air France
C	Continental
E	Eastern
I	In-house Computer Systems
JAL	Japan Air Lines
L	Lockheed
M	Manual
PA	Pan American
Q	Qantas
RDS	Dixon Speas
SAB	Sabena
SCP	Standard Canned Programs
SEW	Southwest Weather Consultants
TWA	TWA
UAL	United Air Lines

EXHIBIT I-3
RESPONDENTS BY CATEGORY
TOTAL = 55



II. MANAGEMENT ACTION SUMMARY

- The maximum potential market for flight planning services worldwide is $38 million, corresponding to 4.75 million flight plans at an average of $8.00 each.

- The total market is not forecast to grow, as a result of the currently pessimistic attitudes of the airlines industry regarding future growth in numbers of flights, in the current economic and legislative environments.

- The impact of in-house computers is not likely to grow, as the investment is greater than small airlines are willing or able to make, and most of the large airlines already have computers installed, or are not intending to do so for economic reasons.

- The automated computer services share of this market in 1975 was 1.32 million plans, or 27.8% of the total. This share is likely to grow by virtue of penetration into that segment (23.6% of the total) which is currently manually operated.

- Because of the varying pricing arrangements, wherein the unautomated segment would expect to pay much less than $8 per plan, the potentially available flight planning services revenue world wide is estimated at $5.07 million.

- While UAL has a relatively small number of clients (5 out of 81 identified), the opportunity for growth exists, without a significant commitment of resources. This opportunity should be pursued in a gradual, methodical process of information gathering and delivery, coupled with effective sales presentations.

- UAL clients like UAL and its product, and so no drastic changes or investments appear to be immediately required in the external marketplace.

- The services market generally is very volatile, with 22% of those interviewed in this study being in the process of changing vendors.

- UAL's marketing opportunities exist, in part, due to the above indicated volatility, and,

    - relatively low penetration of services into small U. S. and foreign airlines

    - relatively low enthusiasm on the part of most of UAL's competitors to grow.

- The only active competitors to UAL in commercial flight planning are Continental Airlines and R. Dixon Speas. Other major vendors, or potential vendors, are discouraging the growth of their flight planning sales.

- Lockheed Service Co. would be a major competitor in the corporate jet segment of the industry.

- The primary requirements for increasing UAL's penetration are,

  - Education of the clients, via detailed descriptive materials.

  - Intelligence gathering by operations personnel to get in touch with dissatified customers - UAL's as well as competitors'.

- The most important sales approach, as defined by most users, is willingness to accommodate the systems to the airlines' existing operating philosophy.

- The major technical features requested by users are,

  - Improved weather information.

  - Ability for small airlines to use UAL's flight following.

- The overall average expected charge per flight plan (considered reasonable) is $7.00, with the overall average actually paid being $8.00. High volume, large airlines pay much less, and foreign airlines with long routes pay much more. Thus, UAL's $5 and $10 charges neatly surround the overall averages, and will need to be restructured according to the target market.

- UAL's internally generated level of over 500,000 flight plans per year can easily justify any modest expense in order to reduce the cost of UAL's own flight operations. These improvements, in turn, will make UAL more attractive to the external market.

- In summary, UAL should proceed to expand its external market by,

  - Preparing and properly distributing an excellent technical/marketing brochure.

  - Collect information from all airlines, through operations personnel professional meetings, about satisfaction planned changes, and technical performance of competitors.

- Examine the possibility and internal value to providing better weather information to the systems. This would be a major competitive advantage, and should pay for itself within UAL's internal operations.

- Adjust the pricing schedule to induce smaller airlines to use the service rather than use manual or canned computer techniques.

- Send out operations people to sell the new package, backed up by staff who know computers.

- Be prepared and willing to accommodate the individual airline's operating philosophy.

III. MARKET SIZE AND FORECASTS

What Are Airlines Currently Doing About Flight Planning?

- All airlines see automation of flight planning as a good thing, if it can save them money. The only ones who report automation as uneconomical are those who fly short segments (usually less than 250 n.m.), those who fly very few routes and find manual planning or "canned" pre-planned schedules to be adequate.

- With only one known exception in each of the two groups, U.S. airlines who filed over 110,000 flight plans in 1975 have in-house computers for that purpose, and airlines who filed fewer use a service, or are not automated. Canadian and foreign airlines do not have a consistent level of demarcation.

- Of the 9 responding large CAB certificated U.S. Airlines (see Exhibit I-2), 6 are currently doing flight planning in-house, and a seventh (Western) expects to be doing so by April 1, 1976. The remaining two, Alaska and Ozark use a service (R. Dixon Speas, and Continental, respectively). Ozark only uses the service for flights greater than 350 n.m. This group reports a total of 1.97 million flight plans prepared in 1975 - 82% of which were prepared in-house.

- Of the 8 smaller CAB certificated passenger airlines responding, only one, Northwest, uses an in-house computer, and that is in addition to manual operations for short flights. Both all-cargo airlines use an outside service, as do 4 of the 8 passenger lines. This group may be summarized as follows:

In-House	1
Automated Service	6
Manual or Canned	2
None	1
Total	10

- There are 8 U.S. supplemental air carriers listed in the World Aviation Directory (WAD). All were contacted except Saturn, which was excluded by request of UAL. Of the remaining 7, questionnaires were completed by 6. The seventh, Modern Air Transport, is in the midst of a prolonged strike, and its survival is uncertain. Of the 6 respondents, 4 use a service, and two, World and Evergreen (ex-Johnson Flying Service) are manual. World is in the process of converting to an automated service, but declines to name the vendor. Rumor has it they are considering Lockheed. Evergreen, currently having no jet aircraft is also considering Lockheed for next year, when they expect to have jets. Thus, by next year, all supplemental air carriers will be using an automated service.

  - Thus, this group further supports the conclusion that services are used by airlines filing less than 110,000 plans, even down to McCulloch (a UAL client) and Evergreen/Johnson, both of which are less than 1,000 plans per year clients.

- Of the 9 U.S. Intrastate, Commuter, Mail, Other Scheduled and Non Scheduled airlines who met the basic requirements to be interviewed, none have in-house computers, and only 2 use a service:

  - Federal Express uses Continental for flight over 1½ house;

  - Ranger Air Cargo uses UAL

  The other respondents use manual, canned plans, or don't do any flight planning because of the nature of their flights; short, repeatable; infrequent, etc. All of which seems to be "uneconomical."

- Canadian Air Lines, of which 7 meet interview requirements and 6 have been interviewed, are not predictable. All report 100,000 or fewer flight plans in 1975. Half use in-house computers, and half use automated services from UAL and Dixon-Speas. There is no relationship to volume. The remaining incompleted interview is with Eastern Provincial Airlines, who is in the process of buying the service from CP Air. However, as will be discussed later, there are potential clients for UAL among these airlines.

- Foreign Airlines, 15 of whom responded from a target population of 114, are a mixed group. Not only is there no relationship between type of service and volume, there are also multiple solutions used by the same airline to handle different lengths of flights.

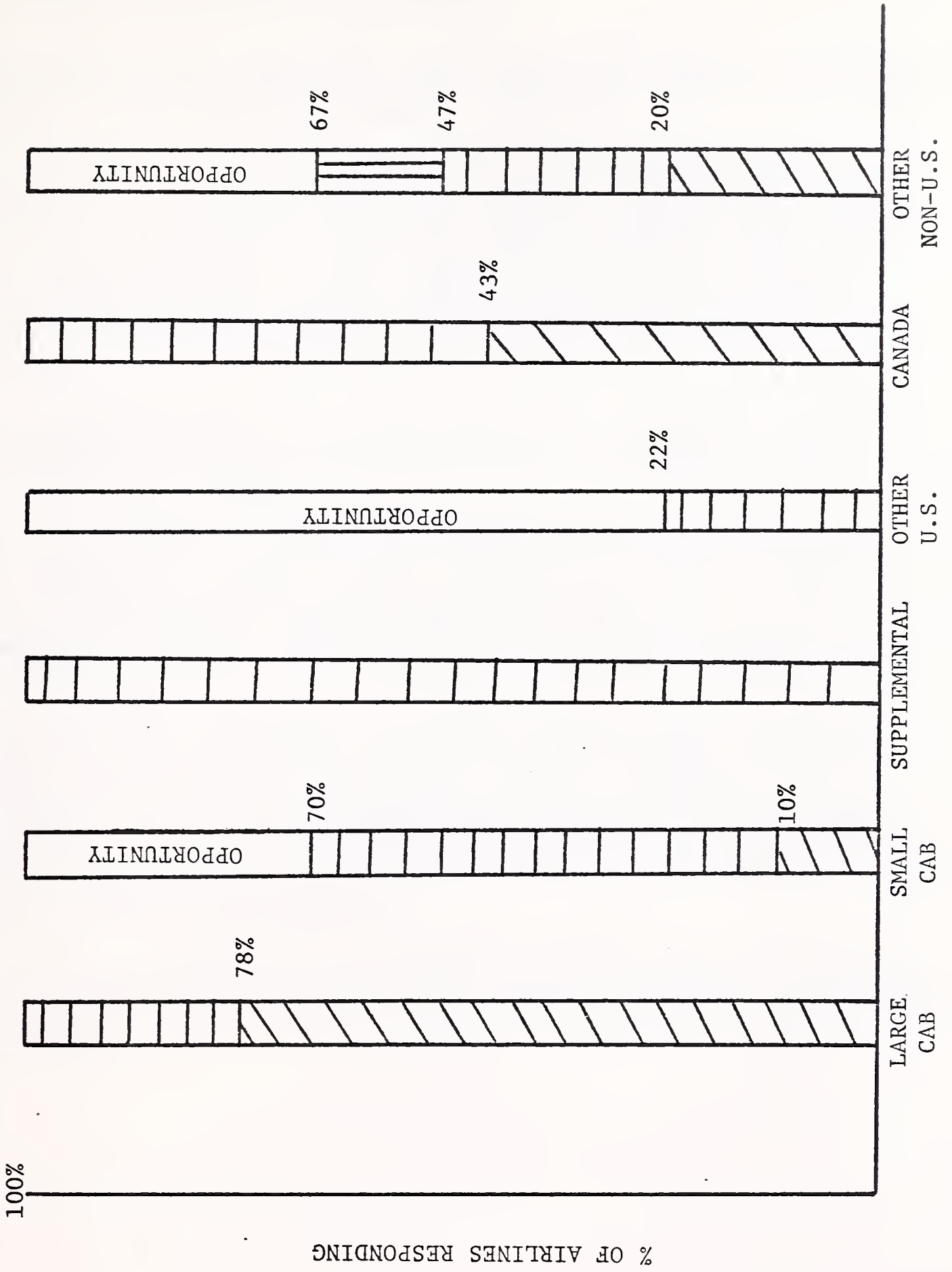
  - All responding foreign airlines report fewer than 39,000 flight plans per year, with the reported median at about 4000 per year.

  - The distribution is as follows:

In-house computer only (including manual for short flights)	3
In-house computer plus outside svc.	1
One Outside service only (including manual for short flights)	4
More than one outside service (including manual for short flights)	2
Manual Only	5
Total	15

- A summary of this information is displayed in Exhibit III-1. The conclusion to be drawn from the exhibit is that new clients are either to be converted from their present systems/service, or the smaller airlines need to be convinced of an economic advantage to automation.

EXHIBIT III-1
CURRENT STATUS OF FLIGHT PLANNING TECHNIQUE
55 RESPONDENTS



What Are Their Expectations For The Future?

- The current mood in the airline industry is pessimistic. A major article in Business Week, December 22, 1975, addresses, "the Airlines' Cash Bind; Can Frank Borman Make Eastern Take Off?"

  While largely an analysis of Eastern Airlines (particularly as compared to its successful competitor (Delta), Business Week indicates that the entire industry is facing financial difficulties. "For the first nine months of 1975 the 11 major scheduled carriers had an aggregate net loss of $10.7 million, compared with aggregate net earnings of $317.2 million for the first nine months of 1974." Pan American, Eastern, American and TWA were reported in the red.

  This depressive attitude is reflected in the responses to the survey questions aimed at estimating the rate of growth of flight planning in the industry.

  Specific responses to questions regarding growth in 1976 and 1980 are summarized in Exhibit III-2. Should one or more airlines fail due to financial crisis, the impact on the potential UAL market will be determined by whether the failed company is a vendor, a competitor's client, a UAL client, or a non-user of flight planning automation.

- As can be seen from Exhibit III-2, the median opinion regarding growth in 1976 resides close to zero, with the greatest optimum being shown by small U.S. airlines, Canadian and three foreign airlines. This is the same group which included the most likely new clients for UAL according to Exhibit III-1. Thus, once again, smaller U.S. airlines, and non-U.S. airlines suggest the best opportunities for new business.

- Virtually no respondent was willing to estimate the level of activity in 1980, either because of the economic uncertainty, or because long range planning was not a customary consideration of the respondent.

EXHIBIT III-2

RESPONDENTS' FORECASTS OF GROWTH OF FLIGHT PLANNING IN 1976

Growth Expected	Number of Airlines Responding						
	Large CAB	Small CAB	Supplemental	Other U.S.	Canadian	Foreign	Total
Over 20%	0	2	2	1	1	1	7
10 to 20%	1	1	0	0	0	2	4
Up to 10%	3	1	0	0	2	3	9
Zero	4	3	3	1	3	2	16
Decrease	2	0	0	0	0	0	2
No Comment	0	3	1	7	0	7	18
TOTAL	10*	10	6	9	6	15	56

* Includes one confidential respondent

How Much Are They Currently Paying?

- Pricing varies according to length of flight, whether it is domestic or international, whether it is "canned" or variable and as a function of other services bundled in with flight planning.

- "Value" seems to be much more the issue than price. Value is tied to the specific requirements of the airline. An airline which occasionally flies a transatlantic charter flight which is scheduled several days in advance will more likely pay $15 for the plan than one which flies 10,000 flights a month in the western part of the U.S.

- "Value" also relates to overall economy of flight activity, rather than, say, least fuel cost. Several airlines will not choose a least fuel plan unless it is consistent with optimum passenger comfort, or maximum payload. Thus, a service which provides a choice of plans which allows the airline to pick an "optimum" would be worth more than one where the computer decided and delivered the optimum plan.

- Exhibit III-3, summarizes the responses to questions about actual and reasonable flight plan costs.

- The data in Exhibit III-3, suggest the following important conclusions, even though the data are somewhat thin and wide ranging:

  - On the average, all but the smaller CAB certificated airlines consider $8.00 to be a reasonable price for a flight plan; this matches well with UAL's range of $5.00 to $10.00, depending upon the terminal.
  - More than half the CAB certificated airline interviewees do not know how much a flight plan costs, but believe it to be considerably more than they are currently paying. This is partly attributable to the fact that many of these airlines do their flight planning in-house, and their EDP costs are not allocated.

  - U.S. Supplemental and Canadian airline interviewees on the average believe they are paying reasonable prices for flight planning.

  - Foreign airlines, on the average, believe they are paying too much for flight plans.

  - Foreign airlines, as a group, were the only ones who could estimate costs with and without communications.

EXHIBIT III-3 (Part 1)

Airline Group	No. Responding	Actual Cost	Reasonable Cost	Includes Communications
LARGE CAB	1	$1.00	$2.00	Yes
	1	Confidential	$8.00	---
	1	$1.00	----	Yes
	1	D/K	$15-$25	---
	1	Confidential	$1.00	Yes
	5	D/K	D/K	---
	Total=10	Avg.=$1.00	Avg.=$8.00	Majority = Yes
SMALLER CAB	1	Confidential	$5 - $7	No
	1	$2.00 domestic $12-$15 int'l.	---	No
	1	D/K	$2.00	---
	1	D/K	$1.50	---
	1	$1.00 per hour	D/K	---
	1	$1.00	$1.00	Yes
	4	D/K	D/K	---
	Total=10	Avg.=$1.50 (excl. one int'l.)	Avg.=$2.50	Majority = No

Note: D/K means "Don't Know"

EXHIBIT III-3 (Part 2)

Airline Group	No. Responding	Actual Cost	Reasonable Cost	Includes Communications
OTHER U.S.	1	Confidential	$1.50	---
	1	$15.00	$15.00	---
	1	$10.00	---	No
	1	---	$12.00	No
	1	$5.00	$5.00	No
	1	$7.00	$7.00	No
	1	$8.00 domestic $10-$12 intn'l.	D/K	No
	1	---	---	Yes
	Total=8	Avg.=$9.00	Avg.=$8.00	Majority = No
CANADIAN	1	$10.00	---	Yes
	1	$6.00	---	No
	1	---	$3-$12	---
	1	$15.00	$13.00	---
	1	$3.00	---	---
	1	$5.00 domestic $20.00 int'l.	---	---
	Total=6	Avg.=$8.00	Avg.=$8.00	Majority = No

EXHIBIT III-3 (Part 3)

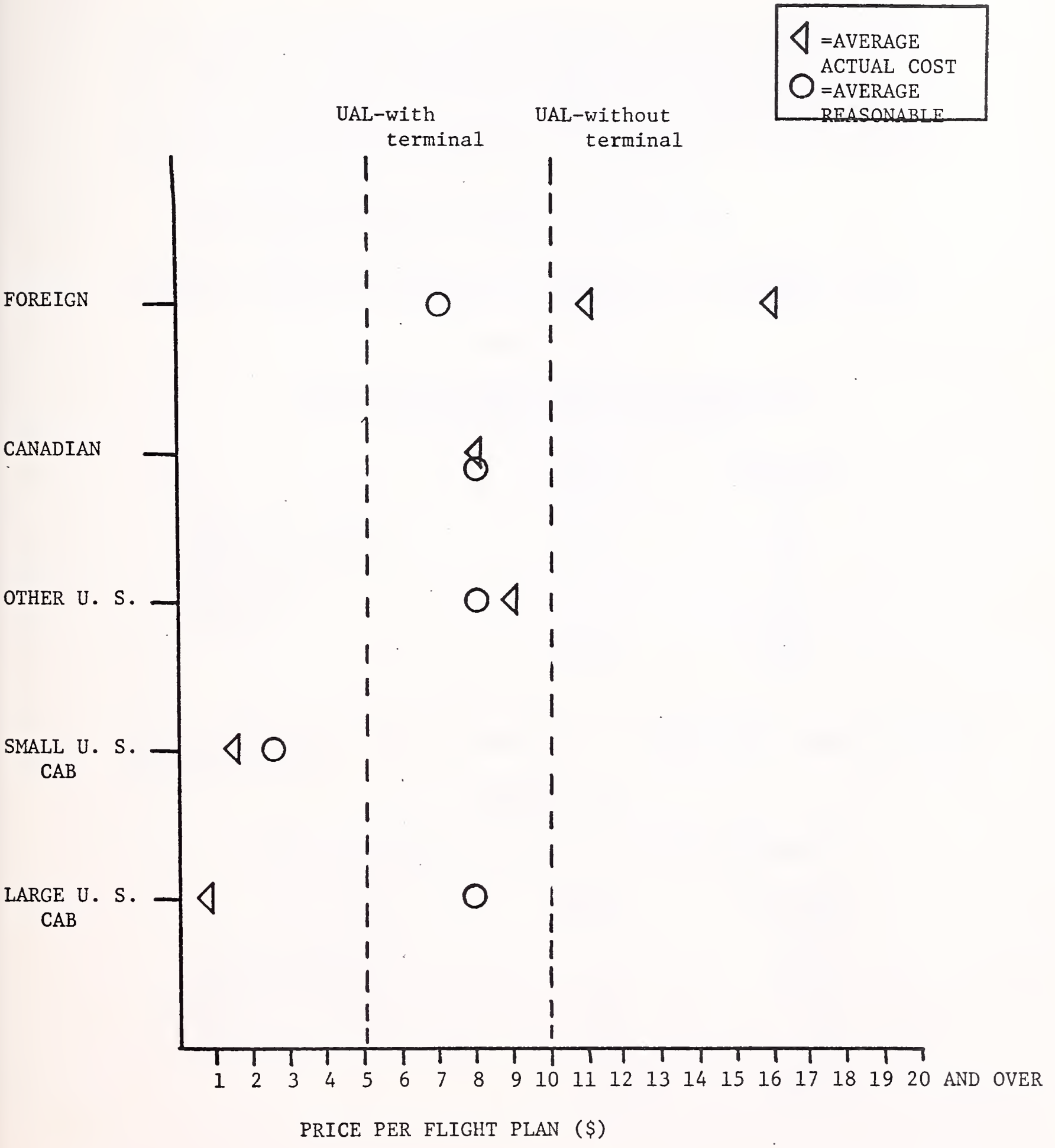
Airline Group	No. Responding	Actual Cost	Reasonable Cost	Includes Communications
FOREIGN	1	---	$5-$10	---
	1	$1.00	$2.00	No
	1	$6.00/$5.00	$ 7.00	Yes/No
	1	$25/$20	$20.00	Yes/No
	1	$40/$30	---	Yes/No
	1	$4/$2	$ 2.00	Yes/No
	1	$7/$5	$10.00	Yes/No
	1	$13.00	$ 2.00	No
	4	---	---	---
	2	D/K	D/K	D/K
	Total=14	Avg.=$16/$11	Avg.=$7.00	OK both ways
OVERALL	Total=48	Avg.=$8.00	Avg.=$7.00	

Notes: All averages are approximations, due to ranges of data
Prices indicated "$A/$B" correspond to communications included "Yes/No"
D/K means "Don't Know"

INPUT

EXHIBIT III-4

RESPONDENTS' ESTIMATES OF ACTUAL AND REASONABLE COSTS FOR A FLIGHT PLAN



- Even though overall averages of these data indicate that actual flight plan costs are considered reasonable, it is clear that individual cases vary widely, and the average information is not to be used for specific planning purposes or proposals regarding anyone's specific airline.

o A most striking feature of the interviews was the relative lack of knowledge and apparent lack of concern about the actual price per flight plan, even though the interviewee's department had financial responsibility for the budget. It appears that cost is an item of competitive evaluation at the time of the original selection of the system/service, but, because it is not a controllable budgetary item, it loses its significance.

Potential and Current Markets, By User Type

o The total number of flight plans generated by responding U.S. and Canadian airlines in 1975 was $2.5 million, as in Exhibit III-5.

EXHIBIT III-5

NUMBER OF REPORTED FLIGHT PLANS GENERATED
BY U.S. AND CANADIAN AIRLINES

	Number	Percent
Major U.S. CAB	2.0 M	80
Smaller U.S. CAB	.1	5
Supplementals	.1	5
Other U.S.	.1	5
Canadian	.2	10
	2.5 M	100%

o The distribution method of generation of these flight plans are shown in Exhibit III-6.

EXHIBIT III-6

HOW FLIGHT PLANS WERE REPORTED TO BE GENERATED

	Number	Percent
In-house computer	1.59 M	62.8
Outside Service	.71	28.1
Both of the above	.13	5.1
Manual	.02	.8
Other (includes canned)	.08	3.2
	2.53 M	100.0

- Of the major airlines polled, Allegheny, Continental, Eastern, Flying Tiger, Hughes Airwest, and United were not included in the preceding data. If we assume these to add another million to the total and allowing a similar 50% increase in the other categories, the totals then become (excluding United):

EXHIBIT III-7

ESTIMATED TOTAL U.S. AND CANADIAN FLIGHT PLANS

	Total	Percent
Major U.S. CAB	3.00 M	80
Smaller U.S. CAB	.15	5
Supplementals	.15	5
Other U.S.	.15	5
Canadian	.30	10
	3.75 M	100

- Continental and Eastern are known to use in-house computers. Hughes Air West is about to begin a service. If we assume Allegheny and Flying Tiger also use a service, and the other added estimates use services or manual, then the distribution remains essentially the same as in Exhibit III-5.

- In an effort to find an easy rule of thumb to determine the number of flight plans prepared by any airline, we compared the reported number of plans prepared in 1975 with a UAL generated summary of the number of flights reported by these airlines in the OAG for 1975. The results, shown in Exhibit III-8 show that there is no simple correlation. However, smaller airlines prepare many fewer flight plans per OAG flight than do larger automated ones. Discarding the highest and the lowest figure suggests that one way to set a boundary on the probable number of flight plans prepared would be to range between one half and two times the number of OAG flights, increasing with increased size. This is probably true because the smaller airlines run many more short flights (250 n.m. or less) which do not require them to prepare flight plans, compared to larger, highly automated airlines which may prepare several plans for long, complex flights

- Of 114 overseas airlines which met the criterion of having 2 or more jets, 11 (10%) responded with data totalling 95,420 flight plans prepared in 1975. These flight plans were prepared as shown in Exhibit III-9. More than 75% of the plans were produced manually.

EXHIBIT III-8

NUMBERS OF FLIGHTS AND REPORTED FLIGHT PLANS
BY CERTIFICATED U.S. AIRLINES

	Airline	OAG Daily Flights x365 (000)	# of Flight Plans Reported (000)	Ratio of Flts/Plans
1.	Airlift International	---	6	---
2.	Air New England	43	---	---
3.	Alaska	---	144	---
4.	Allegheny	237	---	---
5.	American	183	375	2.1
6.	Braniff	80	120	1.5
7.	Continental	54	---	---
8.	Delta	215	234	1.1
9.	Eastern	278	---	---
10.	Frontier	73	45	0.6
11.	Hughes Air West	52	---	---
12.	National	52	130	2.5
13.	Northwest	74	15	.2
14.	Ozark	61	108	1.8
15.	Pan American	14*	128	n/a
16.	Piedmont	47	24	.5
17.	Southern	59	20	.3
18.	Texas International	44	26	.6
19.	TWA	146	584	4.0
20.	United	272	533	2.0
21.	Western	78	150	1.9
22.	Wien Air Alaska	---	1	---
	Totals**	2,062	2,203	1.1

* Flights within domestic OAG only.
** Totals only include numbers were data was available for both columns.

EXHIBIT III-9

REPORTED METHOD OF PREPARATION OF FLIGHT PLANS
BY FOREIGN AIRLINES

	Number (000)	Percent
In-House Computers only	0	0
Outside Service only	0	0
Both of the above	8.0	8.4
Manual	68.7	72.0
Manual plus service	14.9	15.6
Manual plus in-house	2.5	2.6
Manual plus service plus in-house	1.3	1.4
	95.4	100.0%

- A first order estimate of the number of flight plans generated by foreign airlines would be made by assuming our 10% sample to be representative of the universe, yielding nearly one million per year. This being the only data available, we recalculate the total worldwide number of flight plans generated in 1975 as in Exhibit III-10.

EXHIBIT III-10

ESTIMATED TOTAL WORLD-WIDE NUMBER
OF FLIGHT PLANS GENERATED IN 1975

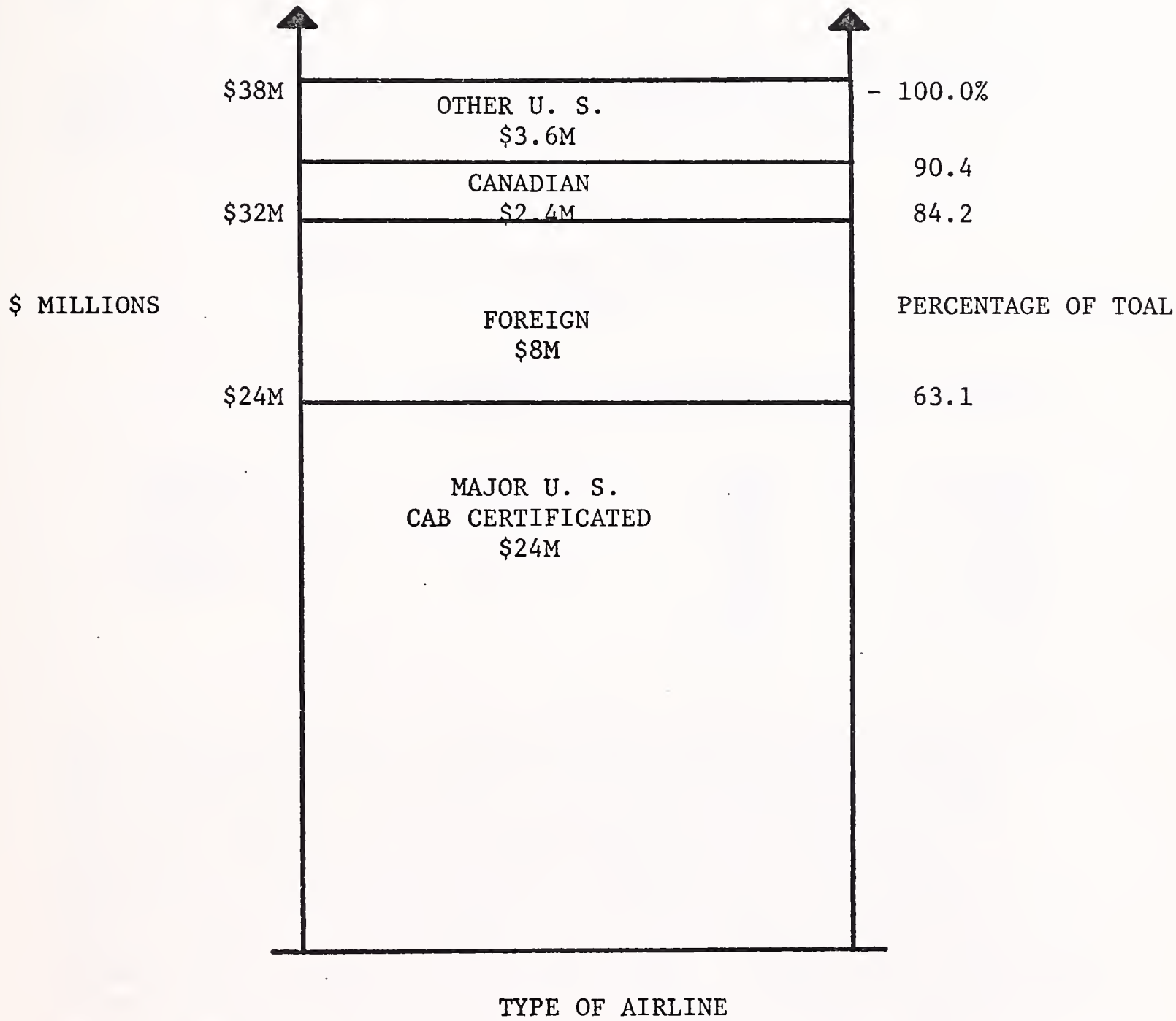
	Total Number	Percent of Total
Major U.S. CAB*	3.00 M	63.1
Smaller U.S. CAB	.15	3.2
Supplemental U.S.	.15	3.2
Other U.S.	.15	3.2
Canadian	.30	6.2
Foreign	1.00	21.1
Total	4.75 M	100.0%
*Excludes UAL internal	0.53 M	

- Based on an average resonable cost per flight plan, if all of the plans indicated in Exhibit III-10 were automated by a service which sold for $8.00 each (average price previously estimated), the total 1975 user expenditures for flight planning would be $38 million, as shown in Exhibit III-11 (excluding UAL internal expenditures).

- In actual practice, we know that most of the large U.S. airlines do their own in-house planning, and are not likely candidates for UAL service. Of those airlines doing over 110,000 plans per year, Alaska National, Ozark, and Western are known to use services, Hughes Air West probably does, and Allegheny and Flying Tiger, may do so. Thus, perhaps 500,000 plans, at UAL's rate of $5.00 (assuming all would use a CRT terminal), yields a potentially available market of $2.5 million for this group.

EXHIBIT III-11

MAXIMUM POTENTIAL MARKET FOR FLIGHT PLANNING IN 1975



- All smaller U.S. CAB certificated, supplementals, and other U.S. are potentially available, as none uses an in-house computer. In this case the question would be whether or not the airline would consider $10.00 per plan (UAL's rate without CRT) valuable. If so, this segment presents a total potentially available market of nearly $0.5 million per year.

- Among the Canadian Airlines, Nordair, CP Air and Air Canada have their own in-house systems. Quebecair and Pacific Western are already UAL clients; Transair Ltd. is a Dixon-Speas client. Eastern Provincial has just agreed to purchase service from CP Air.

- If only the plans which are for jet flights which are prepared by airlines without in-house computer capability are included, the potentially available Canadian revenue is as shown below, in Exhibit III-12.

EXHIBIT III-12

POTENTIALLY AVAILABLE CANADIAN REVENUE
(1975)

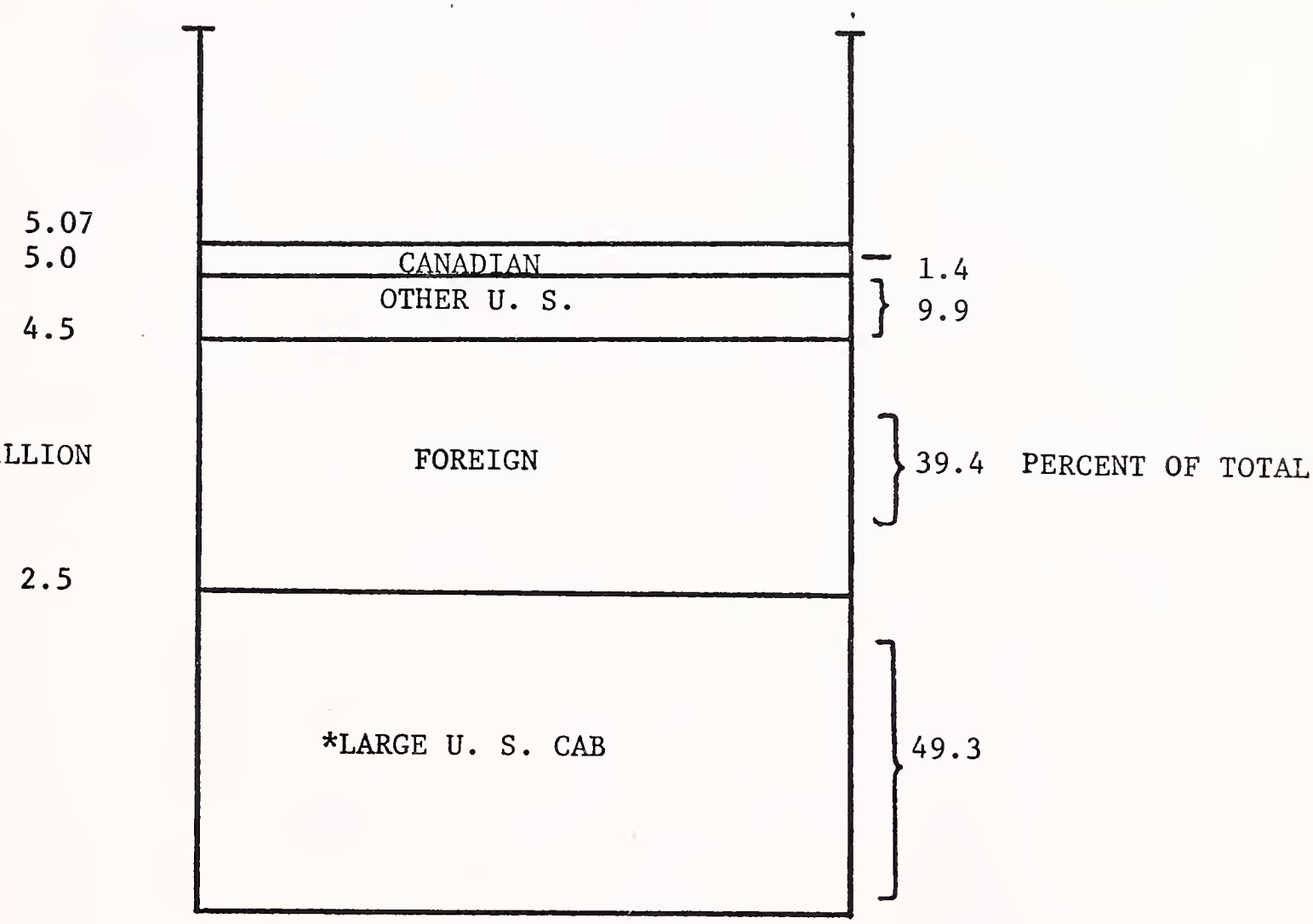
	$/Plan	# of Jet Flights/Yr	Total $
Quebecair	$10	1000	$10,000
Pacific Western	5	3500	17,500
Nordair	5	8500	42,500
Transair Ltd.	10	400	4,000
		13400	$74,000

- The foreign (non-U.S./Canadian) market consisting of airlines with two or more jets, flying segments of 350 miles or more, having labor and fuel cost situations which would justify an average $8, plus communications, cost per flight plan is assumed to be no greater than 30% of the maximum potential of $8 million, equalling $2.4 million per year. Because most of the larger foreign airlines, many of which are known to have in-house computers, did not respond to the survey, the services opportunities are assumed not to exceed $2 million per year. A significant issue here is how much would it actually cost to deliver a flight plan to a small or medium sized airline overseas. While $8 is a useful average, it is clear that the expectations of the responding airlines are much higher, in which case the economic justifications will continue to be unreasonable, and foreign sales will be difficult.

- The consequence of this logical process is an estimated potentially available market for UAL flight planning services as shown in Exhibit III-13 (excluding UAL internal).

EXHIBIT III-13

POTENTIALLY AVAILABLE MARKET FOR FLIGHT PLANNING SERVICES



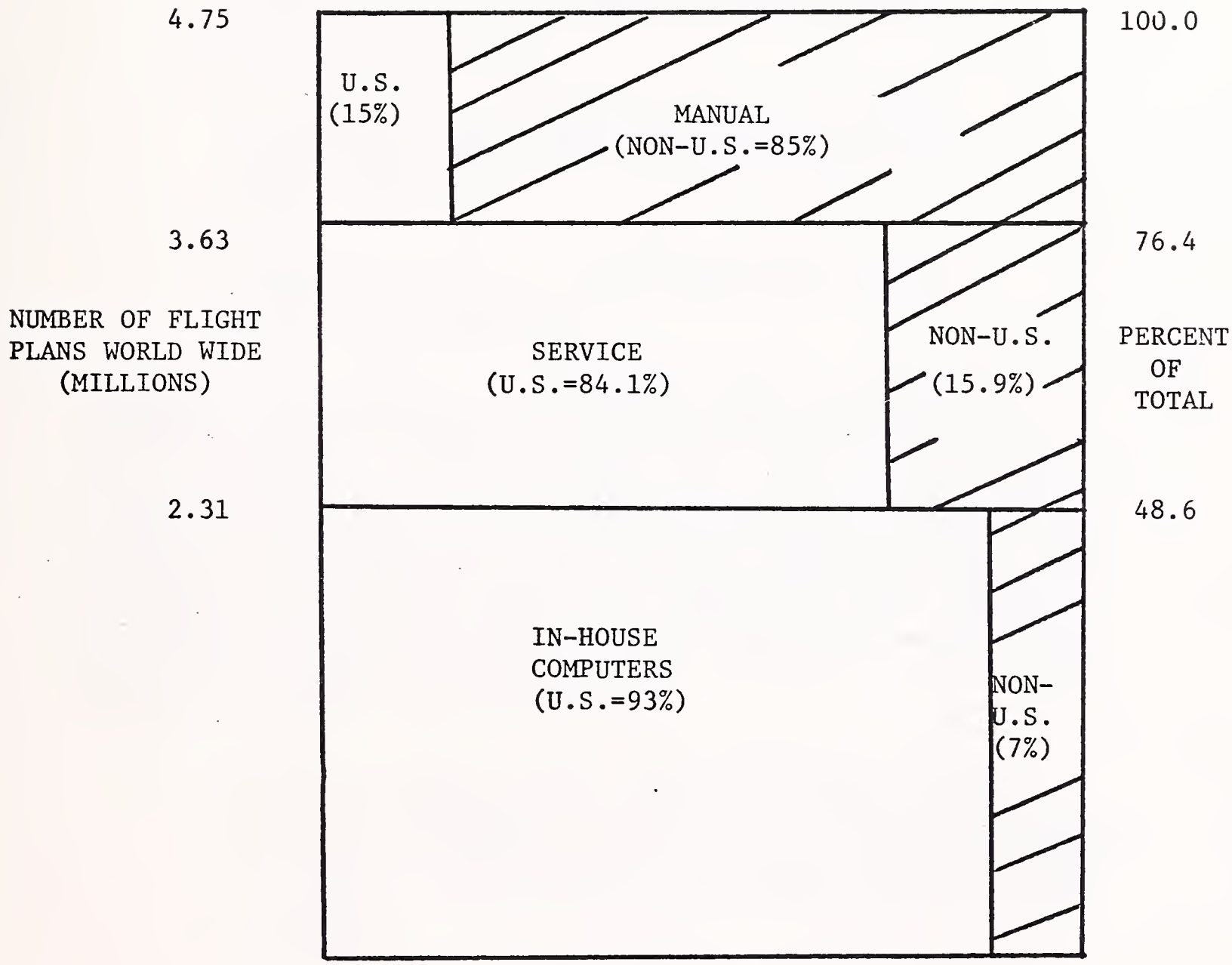
*excludes UAL internal

Penetration of Automation

- Exhibit III-14 summarizes the overall picture, as follows:
  - The overall penetration of automation into the potential market of 4.75 million flight plans per year, for airlines having more than 2 jet aircraft, is 76.4%, worldwide.
  - Of this total amount, 48.6% is via in-house computers, and 27.8% is via computer services purchased from outside vendors.
  - 23.6% of the potential market remains unautomated largely because of the relative cost of the service compared to continuing manual operations, plus the fact that much of the unautomated activity relates to short flights which are simple to plan manually. These flights generally are between 150 and 350 miles in length, or less than one or two hours duration. Except in a very few cases, respondents not using automation were not planning to, for these reasons.

EXHIBIT III-14

PENETRATION OF AUTOMATION OF
FLIGHT PLANNING
(1975)



IV. MARKET REQUIREMENTS AND BEHAVIOR

Technical/Performance Requirements

- o On a scale of 1 to 5 (where 1 = not important and 5 = mandatory), respondents rated 11 flight planning features, as summarized in Exhibit IV-1. Those items wherein more than half the respondents rated the item 4 or 5 are circled. Not all items had the same importance to all groups.

  - All groups rated the reclear function, least fuel burn plans and flight plan format among those most important.

  - Two respondents commented that dial-up would be a disadvantage, and would rate it less than zero. They much preferred a permanently connected terminal.

  - "Ferry Fuel" was an often not understood expression. We soon learned that many airlines call this "tankering."

- o Respondents were asked to indicate the three most important features of their systems, and features which were missing or needed improvement. These responses are summarized in Exhibit IV-2. The summaries are broad categories, in an effort to get the flavor of the problem. Clearly each airline has its own special situation which makes some features more or less desirable, and recourse to the original interview forms would be of value. Only frequently mentioned items have been tabulated in the exhibit. Respondents frequently repeated as most important those features which we had previously requested them to rank and evaluate, and those are excluded from the exhibit.

  - The major items of importance are mostly operational characteristics, rather than features, and encompass promptness, reliability, accuracy, availability of several alternate plans. Features include minimum operational cost plan and least time track plans being available.

  - Inadequate performance often is related to the weather data available. U.S. Government weather information from Suitland, MD, is widely considered to be too old and inadequate by the time it gets into the computer system/service. Airlines indicate a preference for systems/vendors which have the ability to use their own meterological input data as desired, to update Suitland weather.

  - Turnaround time ranges widely from on-line CRT "instant response" systems, to charter flights which order their flight plans days in advance. Exhibit IV-3 summarizes responses to Question 29, regarding response times. Twenty seven out of thirty two respondents are satisfied with turnaround times they are receiving.

EXHIBIT IV-1

RESPONDENT RATING OF IMPORTANCE OF TECHNICAL FEATURES
(SEE QUESTIONNAIRE #25)

Item	Number of Times Each Item was Ranked											
	Scheduled U.S.						Supplemental and Non-Scheduled U.S.					
	Rank 1	2	3	4	5	Tot. Mentions	Rank 1	2	3	4	5	Tot. Mentions
Availability of CRT terminal	2	0	6	1	6	15	1	1	2	0	3	7
Dial-Up	1	1	1	0	0	3	0	1	0	0	0	1
Reclear	2	1	2	2	6	13	0	1	1	1	4	7
Inputs to On-Board Computer	4	0	3	1	0	8	1	2	1	0	1	5
Payload Optimization	3	1	1	2	8	15	1	1	2	1	2	7
FIR Boundaries	4	2	1	1	6	14	1	1	0	1	3	6
Least Fuel Plan	0	0	0	2	12	14	0	0	1	1	5	7
Equal time points	6	2	4	0	1	13	2	1	2	0	1	6
Ferry Fuel	2	2	1	1	8	14	1	1	1	1	1	5
Flight Plan Summary	2	0	2	4	5	13	1	2	2	1	0	6

(continued on following page)

EXHIBIT IV-1 (continued)

RESPONDENT RATING OF IMPORTANCE OF TECHNICAL FEATURES

(SEE QUESTIONNAIRE #25)

Item	Number of Times Each Item was Ranked											
	Scheduled U.S.						Supplemental and Non-Scheduled U.S.					
	Rank 1	2	3	4	5	Tot. Mentions	Rank 1	2	3	4	5	Tot. Mentions
Format	0	1	2	4	3	10	0	0	2	1	2	5
	Canadian Airlines						Foreign Airlines					
CRT	2	1	0	2	1	6	1	1	1	0	2	5
Dial Up	0	2	0	1	0	3	3	0	2	1	0	6
Reclear	0	0	1	2	2	5	1	0	1	1	3	6
On-Board	0	1	3	1	0	5	2	1	2	1	0	6
Payload	0	0	0	2	3	5	1	0	2	1	2	6
FIR	0	1	0	3	2	6	0	1	2	1	2	6
Least Fuel	0	0	1	1	4	6	0	0	0	2	4	6
Equal Time	0	2	1	0	3	6	1	0	2	0	3	5
Ferry Fuel	1	1	1	1	2	6	1	0	3	1	1	6
Summary	1	0	2	2	1	6	1	1	0	4	0	6
Format	0	0	1	1	2	4	0	0	0	1	3	4

EXHIBIT IV-2

ITEMS MENTIONED FREQUENTLY AS BEING
IMPORTANT, MISSING, OR NEEDING IMPROVEMENT

Three Most Important

Item	Number of times Mentioned Rank Order 1	2	3
Promptness of response/availability	6	1	1
Ability to compare several alternate plans	4	2	1
Reliability/accuracy	4	4	0
Minimum operational cost plan	4	0	0
Least time track plan	1	2	1

Items Missing or Needing Improvement

Item	Number of times Mentioned
Current weather information is inadequate	9
Only 1 flight plan is available to the pilot	3
Communications are slow	2
System response is slow	2
Enroute route construction is not available	2
None	6

- Turnaround times are most often between one and ten minutes, and satisfactory.

Features and Enhancements

- By asking about such enhancements as flight following and surface weather, it became clear that the meaning of "flight planning" is quite different to different users. We were often asked, "Aren't they (flight following and surface weather) part of the flight planning?" We recommend that UAL clearly address the definition of this service, and confront the confusion among potential clients via sales and marketing promotion.

  - Exhibit IV-4 summarizes the responses to the question, and affirms the interviewer's impressions that flight following and surface weather are desirable, although not always available from a particular system/vendor.

Economic Factors

- The current cost of operation of a system or purchase of a service does not seem to be an important or well documented item, although comparative cost was an element in the original choice of system or vendor. The ability of the system to minimize the current cost per flight is the existential issue.

- Where the airline is large enough to have a flight operations budget, that budget was always assessed for allocated costs or outside expenses.

- Airlines with in-house systems do not allocate costs well enough to know how much a flight plan costs.

- Airlines using manual planning also do not determine cost for flight plan.

- Airlines buying outside services often buy them bundled with other services, such as reservations, dispatch, ground handling, etc., and do not have a specific price per plan.

- Although the interviewee was always in the flight operations department, he was not always aware of the service contract, and the actual plan cost. A summary and average tabulation of the known/reported price per plan was given earlier, in Exhibit III-3. Detailed questions about the contract (question #37) were generally futile.

- When asked about how much less a competitive service would have to cost in order to induce the client to change vendors, all of the above problems were evident in his general inability to respond crisply. In addition responses were nearly always hedged by the

EXHIBIT IV-3

Response Time	Number of Responses Acceptable	Not Acceptable
Less than 10 seconds	2	-
10 seconds to 1 minute	6	-
1 minute to 10 minutes	11	-
10 minutes to 1 hour	5	2
1 hour to 1 day	2	3
greater than 1 day	1	-
Total	27	5

EXHIBIT IV-4

DESIRABILITY OF SUPPLEMENTAL FEATURES

Feature	Desired (number of responses)
Surface weather	21
Flight following	17
Weather briefing or forecasting	3
Enroute weather updates	1
NOTAMS	1
Maximum payload which can be lifted	1

need for more information. Thus while a 25-30% cost reduction would probably be attractive, it would be difficult to demonstrate, and would probably require a period of parallel operation to prove that none of the features were being lost, and no major internal operating changes would be required.

- Some further insight into the original importance of system cost is given in the section on Customer Purchasing Behavior.

Service and Support Factors

- A surprising characteristic of the flight planning "industry" is the minimal amount of initial installation training and support required/provided, and the negligible amount of support required by the user after initial installation.

- In all cases, the quality and quantity of the on-going support offered by the vendor, or requested by the user was rated satisfactory, when rated.

- Seaboard, the only Lockheed Jet Plan client, declined to comment on the quality of the support, but was obviously dissatisfied.

- Exhibit IV-5 summarizes the user responses and shows that less than one week initially, and virtually no on-going support is commonplace.

Customer Purchasing Behavior

- Twenty-six of the thirty-two respondents to the question indicated they had evaluated (other) services prior to or since the decision to go in-house or to use a particular vendor. As shown in Exhibit IV-6.

  - Of the nine not evaluating others, only one gave a reason, indicating there were not that many available.

  - In-house system users who indicated evaluations had been made felt they were doing a better job themselves than the services they could buy.

  - Most often, the respondents did not know if an evaluation had been made because the system/service had been in so long that they did not remember, or they were not party to the original discussion.

  - Most users continue to review literature and talk to peers in other airlines, but are not motivated to change their positions.

  - More detail on evaluation and propensity to change will be discussed in later sections.

EXHIBIT IV-5

USER SERVICE AND SUPPORT NEEDS

	Number of Responses	
	During Initial Implementation	On-Going
None (or nearly none)	3	8
Less than 1 week (very little or minimal)	10	7
1 week to 1 month	2	0
1 to 2 months	1	0
over 2 months	1	0
"lots"	0	1 (Lockheed client)
Total	17	16

EXHIBIT IV-6

COMPETITIVE EVALUATION

"Did you evaluate any (other) flight planning services?"

	Number of Respondents		
	Services Users	In-House Users	Total
Yes	18	8	26
No	5	1	6
Total	23	9	32

- Interviewees were asked to rank, on a scale of 1=Not important to 5=most important, a series of items which they might have used as a selection criteria in choosing their service vendor. The results are summarized in Exhibit IV-7. The 5 most important items, in rank order are:
  - Reliability
  - Price
  - Turnaround Time
  - On-going Support
  - Features (special system characteristics)

- The above results are somewhat paradoxical, in that price and on-going support rank highly in the original selection criteria, but do not seem very important after the service has been installed.

- The top ranking item, reliability, has been discussed as meaning the service itself as well as the communications system. The service itself was occasionally described with pleasure as having a back up computer system in case of trouble

- The two items mentioned under, "Other," include,
  - UAL has a CRT (Pacific Western)
  - Tailored to Alaska Airlines

- The service was selected by the head of flight operations 50% of the time, and by a committee including the head of flight operations another 30% of the time. Thus, the prime marketing target should be the top man in flight operations (usually a Vice President).

- In 11 out of 17 cases, the person interviewed was a member of the selection committee, or was the individual who made the selection. This lends considerable weight to the validity of the information. (Exhibit IV-8)

- In 19 of 22 cases, flight planning service is paid for out of the flight operations budgets. The balance indicated that it was a corporate expense, see Exhibit IV-9.

- The reasons for selecting a particular system/service, after evaluating available services, were rather vague and not clearly differentiated. The interviewer believes the choices to have been subjective and general, rather than objective and rigorous. Exhibit IV-10 lists the few reasons cited more than once by those who chose in-house systems, as well as those who chose service. Many respondents simply did not remember, as the decision had been made a relatively long time before.

Unique Flight Planning Problems Encountered

- Respondents to the question about unique flight planning situations itemized some very specific issues, and some which were quite general. Some of the specific issues are noted in Exhibit IV-11, along with the airline making the point. Each interview needs to be reviewed to determine the specific problem.

EXHIBIT IV-7

IMPORTANCE OF CERTAIN SELECTION CRITERIA IN CHOOSING A SERVICE VENDOR

Overall Rank	Item	Number Of Times Mentioned Rank 1 (least)	2	3	4	5 (most)	Total Number of Responses
1	Reliability	0	0	2	5	15	22
2	Price	0	1	5	2	14	22
3	Turnaround Time	1	0	4	5	11	21
4	On-Going Support	2	1	4	4	11	22
5	Features	0	1	4	7	8	20
6	Initial Training	2	3	2	4	10	21
7	Documentation	2	4	4	2	9	21
8	Proven References	1	3	8	3	5	20
9	Opportunities to Purchase Software	7	6	2	3	3	21
10	Other	0	0	1	0	1	2

EXHIBIT IV-8

WHO SELECTED THE SERVICE?

	No. of Times Mentioned	Was Interviewee Included? Yes	No
Head of Flight Operations (usually VP Level)	10	5	5
Individual Other than Head of Flight Operations	2	2	0
Committee including Head of Flight Operations	6	4	1
Other ("management" or "pilots")	2	0	0
Total	20	11	6

EXHIBIT IV-9

WHOSE BUDGET PAYS FOR IT?

	Number of Times Mentioned
Flight Operations	19
Corporate	3
Total	22

EXHIBIT IV-10

WHY DID YOU SELECT THE SYSTEM/SERVICE
YOU ARE NOW USING?

In-House Users	Number of Mentions
- Could tailor systems to our own needs/wants	3
- Could not find service as good as our own	3
- Cost factors	3

Services Users	
- Fits our needs best	7
- Low price	6
- Other contracts with the same vendor	3

EXHIBIT IV-11

WHAT UNIQUE SITUATIONS DO YOU FACE IN FLIGHT PLANNING OPERATIONS?

	Respondent
- Our programmers are 4,000 miles away	Air France
- Track selection in the North Atlantic	Finnair
- Most flights programmed for maximum lift-individually tailored	World
- Flights go around the world - plus all come from one site	Trans-International
- Much heavier payloads than other airlines	Seaboard
- Hard to get flight plans for certain routes	Western

More Common Problems	# of Times Cited
- Weather information not good enough	5
- Flights are too short for effective automation	4
- Great variety of long and short routes	2
- Worldwide operations - not scheduled - uncommon routes	2
- No special problems	10

- Ten airlines specifically indicated there were no unique problems.

- The most common complaints were about the inadequacy of the weather information relative to the airlines' needs (frequently seen as a unique problem, or one that they had to live with because better information was not available).

- Interviews made after the mid-contract review were modified to ask if the airlines were living with any special problem because of their choice of vendor, in addition to reasons of uniqueness. This did not yield any novel information other than further complaints about weather information, communiations delays, and some truly minor irritations. Again, each interview should be individually reviewed.

Level of Satisfaction With Current Suppliers

- Exhibit IV-12 shows that 84% of the respondents are satisfied with their present systems or services vendors. Those who are not satisfied with their services vendors are either looking elsewhere, or are resigned to being dissatisfied, as presented in Exhibit IV-14.

- Exhibit IV-13 shows that 87% of those who identified unique problems feel that their current systems adequately takes care of those problems. Specific comments are listed in Exhibit IV-14.

Dissatisfactions with Present Conditions

- Most users are satisfied with their flight planning, as indicated above.

- Frequent dissatisfactions expressed by those who say they are nevertheless quite satisfied with their system/service relate to complaints about weather information and communications delays.

- Exhibit IV-14 details the specific comments of those vendors who expressed dissatisfaction with their present system/service. Dissatisfaction is not necessarily correlated with intention to change system/service vendor. There is sometimes a propensity to change where there is no dissatisfaction.

Expectations for the Future

- Particularly in the pre-mid project review, we asked interviewees about their expectations regarding the future of flight planning systems. Expectations in this area are much the same as in the rest of the data processing world, and include greater sophistication, wider usage, lower cost, improved reliability and accuracy. After the mid-project review, we no longer specifically addressed that question.

- Particular technical and operational improvements which were mentioned in discussions with users include expectations of:

  - Automatic update of in-flight computers

  - Computer to computer transfer of weather data

EXHIBIT IV-12

ARE YOU SATISFIED WITH YOUR PRESENT SYSTEM?

	Number of Responses		
	Yes	No	Total
In-House System Users	7	1	8
Services Users	19	3	22
Users of both Systems and Service	1	1	2
Total	27	5	32
Percent	84%	16%	100%

EXHIBIT IV-13

HOW WELL DOES YOUR PRESENT SYSTEM HANDLE YOUR UNIQUE PROBLEMS?

	Number of Responses		
	OK	Not-OK	Total
In-House System Users	4	1	5
Services Users	14	2	16
Users of both Systems and Service	1	1	2
Mostly Manual (with or without some automation)	7	-	7
Total	26	4	30
Percent	87%	13%	100%

EXHIBIT IV-14

DISSATISFACTIONS WITH PRESENT CONDITIONS

Air France	Having problems using Sabena system on their in-house computer. Planning to move themselves and their clients into a relationship with Pan Am, who has experience with the Sabena system.
Aerovias Nacionales de Colombia	Presently operate manually, and also use Pan Am and R. Dixon Speas services. The Pan Am service does not provide "tropopause information." They are not planning any changes
Air Siam	Currently using manual, Continental and Japan Airlines. In their mail response they indicate "Communications is unserviceable. Computer is unserviceable." Paradoxically, they also indicate they are satisfied with the system/ service performance and that they are planning a future change for a cheaper system.
Transair Ltd.	Mostly manual, also using R. Dixon Speas, having problems in getting long haul weather information. Not satisfied with system because of bad distance errors, and looking for a new supplier.
Confidential (See FP018)	Vendor's system handles problems quite well, but respondent is obviously uncomfortable about discussing his attitude and problems.
Braniff	In-house systems, which is, "90% of all you could expect." Complaints include "the computer being down when you most need it," and the problems of sharing the computer with other EDP activities which have priority over flight planning (such as payroll).

- Flight plans oriented to overall lowest operational costs, including internal operating costs (personnel utilization, etc.)

- Non-scheduled airlines hope for availability of automated flight following which they can afford , plus regulations changes which will allow them to use it instead of having to pay a man who may only have one flight to follow all day. This could be an important service opportunity.

Propensity to Change

o How long have you had your present system?

  - The median flight planning systems/service has been operational 3-5 years.

  - The data are shown in Exhibit IV-15, there does not appear to be any significant pattern difference, except that the larger U.S. airlines have been using automated flight planning for a relatively longer time than have the other groups.

Potential New Business due to Plans for Change

o Numerous interviewees plan to make changes in their systems, service vendor, or product, and are delineated in Exhibit IV-16. Many of these are distinctly good marketing opportunities for UAL, which have been forwarded to UAL by INPUT immediately upon discovery of the opportunity.

o Of the 55 survey respondents, 19 are available for information about changes, or are actively pursuing system/service vendor changes. Of the 19, eight admit to actively proceeding to change vendors and 4 are moving from manual systems to a service. Thus 12/55=22% of the respondents represent(ed) opportunities for UAL to become the principal flight planning services vendor.

o The 12 admitted potential new clients categorize as follows:

Certificated U.S	4
Other U.S.	3
Canadian	2
Foreign	3
	12

o Considering that almost all the potential U.S. and Canadian airlines have been interviewed, while only 10% of the foreign airlines returned the mail surveys, volatility (and hence, opportunity) would seem to be greatest with foreign airlines, followed by Canadian Airlines, followed by smaller U.S. Airlines.

EXHIBIT IV-15

HOW LONG HAVE YOU BEEN USING YOUR PRESENT SYSTEM/SERVICE?
(Number of Responses)

Time	US CAB Scheduled		Supplemental & Other US		Canadian		Foreign		Total	
	IH	S	IH	S	IH	S	IH	S	IH	S
0-1 Year	0	1	0	3	0	1	0	1	0	6
1-3 Years	1	3	0	2	0	2	1	1	2	8
3-5 Years	1	2	0	2	1	0	0	1	2	5
5-10 Years	2	3	0	0	2	0	1	0	5	3
Greater than 10 Years	1	1	0	0	0	0	0	1	1	2
TOTAL	5	10	0	7	3	3	2	4	10	24
									34	

Note: IH = In House Systems S=Service

EXHIBIT IV-16

POTENTIAL NEW BUSINESS DUE TO PLANS FOR CHANGE

U.S. AIRLINES (CERTIFICATED)

Ozark	Currently using Continental for flight planning and reservations. Going back to Eastern (after 5 years) for reservations; maybe for flight planning also. The issue sounds more political than technical.
Western	Changing from service purchased from Southeast Weather to FM type system with Delta, which Western considers to be an in-house system. Delta will co-host the Western programs in Delta's computer. Change completion due April 1, 1976.
Frontier	Says all is well, but will consider talking seriously to any vendor. They have been using Continental for 2 years.
Piedmont	Using Eastern Airlines. Will be adding their flight following in May 1976.
Southern Airways	Have been using Southeast Weather Consultants. In process of changing to Eastern, who is already doing their reservation, simulator, etc. "Can't afford not to."
Texas International	Currently using Continental. No plan to change. Expecting new program soon which will compute and incorporate runway attitude at arrival points.
Wien Air Alaska	Presently manual, considering automation. Continental representative was there this week. Expect change-over this month.

U.S. SUPPLEMENTAL AND OTHER AIRLINES

Capitol International	Currently using Continental and Southeast Weather. Claim no plans for change, but known to be checking out UAL system at Ranger Air Cargo.
World Airways, Inc.	Currently manual, planning to change to a service. Decline to name vendor. Evergreen (Johnson Flying Service) says it may be Lockheed.

EXHIBIT IV-16 continued.

Evergreen (Johnson Flying Service)	Getting jets this year. Wants to get a service. Likes Lockheed. Wants to know what else is available. Currently manual.
SMB Stage Lines	Manual. Want to automate surface weather and flight following.
Ranger Air Cargo	UAL client. Want flight following, and claim UAL cannot provide. Will do themselves.
CANADIAN AIRLINES	
Air Canada	Changing from standard TTY to hi-speed TTY
CP Air	Will be upgrading in-house system; considering getting new hardware. Currently using IBM 1130 and System 7. May get Univac 9030 or General Automation Systems; or, may tap into resources of their company's EDP department via time-sharing.
Nordair	In process of evaluating replacement for hybrid in-house system. May buy UAL service.
Transair Ltd.	Looking at replacement for Dixon-Speas, due to large errors.
FOREIGN AIRLINES	
Air France	A vendor of services to 12 other airlines. Currently using Sabena software on IBM 360/30 equipment. As a result of the death of a programmer Air France can no longer be satisfactorily supported by Sabena, and plans to take itself and its 12 customers into an arrangement with another vendor - probably Pan American, who is also experienced with Sabena systems.
Cathay Pacific Airways	Currently manual. Trying to prove cost effectiveness of a service, as an intermediate step to an in-house system.
SAS	Currently using Dixon Speas. Two studies are under way; one to replace Dixon Speas after 1977, and the other to develop standard canned programs. They are requesting information and assistance.
Aerovias Nacionales de Cölümbia	Using Pan Am, and not satisfied. Used to use Dixon-Speas, and received "tropopause information" which they do not get from Pan Am. Indicate no present plans for change.

- How important is cost in inducing change?

- If all the hedging about "it depends on...." is ignored, the following table indicates respondents' estimates of how much cheaper a completing service would have to be (if all operational conditions are met) to induce them to change from their present system/service.

	Number of Respondents
less than 20%	0
20-29%	4
30% or more	4
Total	8

- Even though only 8 respondents were willing to choose a figure, the results are typical of other industries, where 25% cost reduction is considered a good rule of thumb for inducing change where cost is not the major factor.

- Comments relating to this question reinforce that cost is not the major factor and that many respondents do not know their costs.

V COMPETITIVE ENVIRONMENT

Who Are The Competitors?

- Competition for flight planning services come mostly from airlines with in-house computer systems, and is usually only one of several automation products offered.

- Airline vendors of flight planning services are shown below in Exhibit V-1.

EXHIBIT V-1

VENDORS OF FLIGHT PLANNING SERVICES

Airline	Number of Estimated Clients
Continental	17
Air France	12
Pan Am	12
United	5
Eastern	3
TWA	2
Braniff	1
CP Air	1
Delta	1

Non-Airlines	Estimated Number of Commercial Clients
R. Dixon-Speas	23
Southeast Weather Consultants	3
Lockheed Service Company	1
Total	81

- Lockheed and Southeast Weather consultants also serve an undetermined number of non-commercial, corporate jet aircraft.

- Major computer companies do not service this market. Even IBM and CDC, who provide significant amounts of hardware and software to the airlines industry do not provide systems, software, or services specifically for flight planning.

- Fixed base operators such as Butler Aviation are not involved in flight planning. Some receive plans by TTY as a service to their clients.

Services Offered

- All firms offer flight planning as one of many automated services. Except for Continental and the non-airline vendors, suppliers view flight planning as a product their clients expect them to provide along with the other services, and generally do not market it enthusiastically.

Pricing Structure

- Because flight planning is one of many services offered, pricing is usually a negotiation dependent upon other services being provided by the same vendor, whether they be EDP services or not. For example, Pan Am offers complete ground handling services in Europe, and will include flight planning if requested.

- When flight planning is offered as a separately priced item, such as in the price list included in the following write-up on Continental airlines the price is a function of quantity and segment length.

- Price is also a function of whether the plans are canned, stored in advance, calculated on-line, etc.

- As was shown earlier, pricing reports from users vary from $1 to over $20 with an overall average around $8.

- More specific information is included in the individual vendor exhibits.

Sales and Promotional Activities

- None of the vendors interviewed has more than a minimal level of sales and promotional activities. Virtually no literature is available. Dixon Speas has perhaps the most impressive commercial documentation available. Literature which is available is hard to get, as the vendors are very protective of themselves in what they perceive to be a highly competitive environment.

- Almost no journal or other commercial advertising is done. Occasionally an airline will run an ad which details all the planning, maintenance and operational services offered, casually mentioning flight planning as one available service.

- Airlines expect to be called upon by vendors who want to sell them flight planning. They are not accustomed to reading about it in journals, or receiving literature in the mail. They would like to receive literature in the mail. UAL should do so.

- Most information about flight planning is exchanged between operations personnel at professional meetings.

Recent and Expected Changes in Market Position

- As detailed in the previous chapter, in the section on "Propensity to change," it was noted that 22% of the interviewed clients are in process of changing services vendors. The industry appears to be volatile, but the motivation for change is quite individualistic.

- Continental will continue to grow, as a consequence of its aggressive attitude toward the market. Dixon Speas will likely also continue to grow, but is a smaller scale competitor to UAL than Continental.

- Pan Am will grow suddenly, almost by default, as a consequence of a new, forthcoming relationship with Air France.

- Other vendors are generally not pursuing growth in flight planning for commercial airlines, and can be expected to grow only to the extent that clients solicit them.

Current and Expected Changes in Product Offerings

- The product change most in demand by users is an improved weather update, which will provide more current information than the U.S. Weather Service at Suitland. By the time the Suitland weather is processed through the various systems, users find it inadequate.

- Flight following and surface weather new offerings and improvements are expected by clients.

- Vendors offer little information about specific new offerings planned - even to their clients. What specific information is available is detailed in the following vendor exhibits.

Evaluation of Each Competitor

- The following exhibits, one per vendor, gives all the currently available information provided by vendors, users, and commercial literature. Wherever users were willing to evaluate their vendor, that information is included in the following exhibits.

EXHIBIT V-2

CONTINENTAL AIRLINES

- Continental Airlines, through its wholly-owned subsidiary, Mutual Computer Services, Los Angeles, provides a variety of data processing services to other airlines, including reservations to 12 carriers; SAFE (System for Automated Flight Efficiency), which is an automated dispatch service, automated flight planning (to about 20 carriers), and flight following for Mexicana and Air Siam. Continental is the major competitor to UAL in this business.

- We have identified 17 flight planning clients of Continental:

	Airline	Source	Date of Contract
1.	Air Siam	Interview	-
2.	Airlift International	Interview & CAB	2/1/75
3.	Capitol International	" "	5/1/75
4.	Federal Express	" "	12/15/74
5.	Frontier	Interview	-
6.	Ozark	Interview	-
7.	Texas International	Interview	-
8.	Aeronaves de Mexico	CAB	6/10/75
9.	British West Indian	"	11/1/75
10	Mexicana de Aviacion	"	12/9/74
11.	Pakistan International	"	11/4/75
12.	Royal Flight of the Sultanate of Oman	"	5/12/75
13.	Varig	"	9/15/75
14.	British Caledonian	Aviation Week	-
15.	China Airlines	"	-
16.	Korean Airlines	"	-
17.	Philippine Airlines	Aviation Week & CAB	1/1/76

- The information available from CAB, which lists all contracts for value greater than $50,000 lists 1975 Continental contracts exclusively, suggesting that other airlines did not write any contracts exceeding $50,000 in 1975.

- The contracts are not only one-year contracts. For example, the Pakistan contract is for 3 years, and includes a rate discount schedule.

- Continental's standard one-year price schedule is shown in Exhibit V-2-A.

Exhibit V-2

- o Two important articles on Continental's activities appear in the August 25, 1975 edition of Aviation Week and Space Technology, and will be appended to this report.

  - Continental Marketing Dispatch Systems
    pp 51-52

  - Shared Computer Reservations Group
    pp 57-58

EXHIBIT V-2-A

STANDARD ONE-YEAR PRICE SCHEDULE
FLIGHT PLANNING - CONTINENTAL AIR LINES

Number of Plans/Month	Category I 0-1000 Nautical Miles	Category II 1001-1500 Nautical Miles	Category III 1501-3000 Nautical Miles	Category IV Over 3000 Nautical Miles
First 150	$10	$15	$20	$25
Next 250	8	12	16	20
Next 250	6	9	12	15
Over 650	4	6	8	10

The rates set forth in the above schedules are for single trip segments. When a nonstrip trip is marginal (or impossible), it may be neccesary to furnish multiple flight plans to complete the trip, in which case the rate shall be that for the routing containing the largest number of trip segments.

- o Information and/or assistance from Continental or Mutual Computer is virtually unavailable except through Mr. Brendon Hickman, Manager Flight Planning. There is very little literature, which is very difficult to obtain. We may be able to get some.

EXHIBIT V - 2 continued

Comments from Users Interviewed

Air Siam
- Using Continental and Japan Airlines for 2 years.
- Satisfied.
- 1300 plans in 1975.
- $13 each for long flights; $6 for short flights.

Ozark
- Using Continental for flights greater than 350 n.m.
- Changing back to Eastern for Reservations, and, perhaps for flight planning.
- 108,000 plans in 1975.
- Declines to discuss price.

Airlift International
- Using Continental since 1968/69.
- Satisfied.
- 5000 domestic plans in 1975, plus international and military.
- $2 for domestic plan; $12.50 to $15 for international
- Communications and Southland Weather are problems; all flight plans share computer with reservations system.
- Nice feature is comparison of flight plan forecast against actual performance.
- Service is priced per plan, including communications, and runs $1500-$2100 per month, average.

Frontier Airlines
- Using Continental 2 years.
- Satisfied.
- 45,000 plans in 1975.
- Proved to be the best for the cost.

Texas International
- Uses Continental for 1½ years, flights greater than 270 n.m.
- Satisfied.
- 25,550 plans in 1975.
- Systems can calculate runway elevation and correct flight plan at point of departure.
- Working on system to do the same at arrival.
- Each dispatch position has CRT - also used for flight following.
- All flights have stored routes. Computer only gives them altitudes.
- They get 3 plans for the price:
  Main Plan - minimum cost, detailed.
  Summary of minimum cost plan within schedule.
  Summary of minimum time plan.

EXHIBIT V -2 continued

- There are communications problems.
- Package deal includes weather and flight watch.

Capitol Int'l Airways, Inc.
- Use manual for flights less than 1 hour.
- Use Continental for 4 years, replacing Dixon-Speas after 3 or 4 years.
- Use Southeast Weather to update weather on international flights.
- 7,000 plans in 1975.
- $12 for international.
- $10 for intra-European.
- $8 for domestic US.
- Continental handles well their need to be able to use almost any city pairs. No fixed route structure.
- Chose Continental because it "went in with their automated navigation system."
- Use of Southland Weather is a problem. Need updates.
- Contract based on yearly use, priced per plan, plus number of free test plans.
- Monthly expense about $5,000.

Federal Express Corp.
- Using Continental 1½ years, flights over 1½ hours.
- System offers maximum flexibility on rerouting, to balance loads.
- Selected over Lockheed, Dixon Speas, and Southeast Weather strictly on price.

Contact

Mr. Brendon Hickman, Manager Flight Planning
Continental Air Lines, Inc.
International Airport
Los Angeles, CA. 90009

(213) 646-6096

EXHIBIT V-3

DELTA AIRLINES

- Delta Airlines has a computerized flight planning system, as well as a shared reservations service (Multi-Host). Most of the reservations users are commuter airlines, such as Air Sunshine, Florida; Bar Harbor Airways, Maine; and Scenic Airlines, Las Vegas. There is only one known user of the flight planning service, Western Airlines, which is essentially a facilities management client.

- Delta does not market the flight planning system, and would perhaps be interested in selling the service or the system if somebody came and asked them for it.

- They let themselves be known at airlines meetings, but do not advertise. There is no literature available.

Contact

Charles Gravitt
General Manager
Computer Services Planning
Delta Air Lines, Inc.
3550 Greenbriar Parkway
Atlanta, GA. 30331
(404) 346-6282

EXHIBIT V-4

EASTERN AIRLINES

- Eastern Airlines (EA) has a computer sciences activity which grossed $5.8 million in sales in 1975, down from $6.7 million in 1974. Much more than flight planning is included, e.g., the design of a computer system to serve C.I.T. Financial Corporation's consumer finance subsidiary. A multi-year facilities management contract is involved to operate the system - called CITation - at 800 branch offices. In addition, EA was a pioneer in sales of reservations computer programs, automatic ticketing, and fare determination systems.

- EA is not soliciting new flight planning, as they are up to capacity on their system.

- They sell flight planning as a stand alone service, or bundled with other services.

- They have no sales offices or literature, and one part-time sales person. Selling is done by word of mouth at meetings.

- Prices are negotiated individually.

- Services are not offered for corporate jets. No competition to Lockheed.

- The market for flight planning is not big enough to warrant any more effort than they are applying.

- They now have 3 clients - may get up to 7 this year.

Comments from Users Interviewed

Ozark
- Used Eastern 3 years, including reservations. Changed to Continental 5 years, including reservations. Now going back to EA for reservation, maybe flight planning also.

Piedmont
- Uses EA service November 1975, for flights over 250 miles.
- Approximately 2,000 flights per month, at $1 each. Uses standard flight plan, changed summer and winter to correct for wind.
- Satisfied with Service.
- Will add flight following in May 1976.
- Important feature is ability to store and recall flight plans for 3 days.
- Like EA's fail safe system of typing computers together.

EXHIBIT V-4 continued.

National Airlines

- Using EA since June 1971, in addition to service from Pan Am in London.
- System resident in EA's computers. National hopes to bring it in house when they have more capacity. Will not rewrite Pan Am's London program, as it is "too cheap."
- 130,000 computerized plans in 1975, running about $1 for domestic segments.
- Like the EA system because they can modify their programs even though resident in EA computers.
- Payment by the plan, amounts to about $6,000 per month.

Contact

Mr. Paul Mercer, Executive Assistant, Business Affairs
Eastern Airlines
Miami International Airport
Miami, FL 33148
(305) 873-2211

EXHIBIT V-5

LOCKHEED SERVICE COMPANY

- Lockheed Service Company offers Lockheed Jet Plan (LJP) primarily to corporate jet operators. The only known commercial client is Seaboard World Airlines, and they are quite unhappy.

- Possible commercial clients considering converting from manual systems are Evergreen International (Johnson Flying Service) and World Airways. UAL should attempt to intercept both of these conversions.

- Lockheed maintains a rigid paranoid position regarding information, and is not interested in giving or getting any information about flight planning.

- They strongly deny the "rumor" that they are going out of business.

- Seaboard has used LJP for 3 years, and appears to be locked in for 2 more years. They have previously been clients of Continental and Dixon-Speas. They describe LJP as being a good system, and at the same time are unhappy and unwilling to discuss it.

- Dial-up is considered by Seaboard to be a dis-advantage.

Contact

Robert Wills
Manager, Jet Plan Development
Aviation Services
Lockheed Service Company
Ontario, CA

(714) 988-2245

EXHIBIT V-6

PAN AMERICAN WORLD AIRWAYS

- Pan Am has 12 clients around the world. They are mainly interested in total handling contracts. Their clients expect them to provide flight planning and dispatch services. Many airlines do not have their own dispatchers - Pan Am does all that for them - packaged.

- Pan Am writes individual contracts, due to the variety of package options.

- Flight planning is of minor interest to them - earns about $500,000 per year.

- Total dispatch service costs $10 per flight plan hour.

- Flight planning only costs $7 per flight plan hour, for departure activity only.

- Current clients include many Eastern bloc airlines:

  - Aeroflot (Russia)
  - Pakistan Airlines (PIA)
  - Avianca (Columbia)
  - JAT (Yugoslavia)
  - East Germany
  - TAROM (Romania)
  - CSA (Czechoslovakia)
  - ALIA (Royal Jordanian Airline)
  - Ariana Afghan (Afghanistan)
  - Varig (Brazil)
  - National (U.S.)

- Air France is currently in process of making some arrangement with Pan Am, as a result of problems with Sabena, whose program they use. Air France apparently represents 12 airlines which together elected to make the arrangement with Pan Am. These airlines include:

  - Air France
  - French Air Force
  - Al Italia
  - Portuguese Airways
  - W. German Air Force
  - Aero Mexico
  - Sabena
  - Air Afrique
  - Royal Air Maroc

- Air France considers flight planning to be less important than other DP applications. They also do flight following, reservations, check-in, and cargo for their clients.

Exhibit V-6 continued.

- Pan Am will charge Air France $5 to $10 per plan, depending on length of flight. Air France does 8000 plans per year itself, on an IBM 360 using Sabena programs. This has been going on for 6 years. Sabena can no longer support them due to the death of their chief programmer.

- Air France chose Pan Am after also evaluating UAL, Lufthansa, Continental, and Dixon Speas. The choice was actually made by Air France's airline pool.

- Dynamic route programming is a highly desirable Pan Am feature. En route construction and reclearance are not available.

- Avianca does 120 flight plans per year, and pays Pan Am $7 each, including communications, or $5 without communications. Pays about $800 per month.

- Avianca is not satisfied with Pan Am due to absence of "tropopause information."

- Avianca says Southern hemisphere weather data is poor, and plans do not come out well.

EXHIBIT V-7

R. DIXON-SPEAS

- R. Dixon-Speas (RDS) provides a wide range of consulting, planning, and operations services to the airlines industry. One of their many offerings is an automated flight planning service. Documentation of their services is extensive, and is being forwarded to UAL with this report. Hence, much of the background data which is not directly applicable is omitted here. RDS is a subsidiary of Planning Research Corp.

- Flight planning services are sold primarily by Mr. Speas himself, from the New York Office, Mr. Ray Kelly, an old friend of Mr. Speas and a retired UAL manager, residing in Menlo Park, CA; and various newer personnel in an office in Los Angeles.

- RDS claims to have 23 commercial airline clients for their detailed flight planning service.

- RDS system operates in a pair of IBM 360s, receives weather input from U.S. National Weather Service, and offers an on-line communications capability.

- RDS is a significant competitor for UAL in the smaller U.S. market, as well as Canadian and other foreign airlines. They have been in business a long time, and have a generally banal reputation, although we encountered a couple of users who were quite discontent.

- Other automated services offered by RDS are crew scheduling, automated cargo documentation, and a library of software packages which are licensed and address reservations, management information, operations, maintenance, scheduling and accounting.

Comments from RDS Users

Finnair
- Uses RDS for North Atlantic Service (since 1970), and regional flight planning in-house (since 5/75).
- Chose RDS for economic reasons.
- Satisfied with service.
- Decline financial information and number of plans.

Icelandic Airlines
- Using RDS less than one year, for long routes.
- Satisfied.
- 2800 automated plus manual plans in 1975.
- Are presently considering further automation, if economically feasible. Possible lead for UAL.
- Might change service for cost reduction of 30%, but has not indicated present costs.

Exhibit V-7 continued.

SAS
- Using Dixon-Speas until 1977, then planning to change. No further information. UAL should investigate.

Transair Ltd.
- Mostly manual, using RDS since 1973.
- Selected RDS on reputation - did not evaluate other services.
- Dissatisfied. UAL should investigate.
- Accuracy is not good. Errors up to 500 miles.
- Payments, by the plan, vary from 0 - $700 per month, depending on seasonal traffic.

Overseas National Airways
- Using RDS for 5 years.
- Satisfied.
- Selected on the basis of economy and geographic proximity.
- 5,000 to 7,000 plans in 1975.
- $3,000 per month for the service ($6 per plan), on the basis of an annual contract.

Alaska Airlines
- Using RDS for 6 or 7 years, for all jet flights.
- Satisfied.
- Overall, 1200 plans per month.
- We estimate cost at $1 each.
- Selected RDS because of their willingness to tailor the system to airline's needs.
- Unhappy about weather information from U.S.
- Currently using Continental communications and reservations, and are about to get surface weather from Continental. They do flight following in-house, manually.
- Would like to receive information on what else is available.

Contact

David R. Bornemann, Senior Vice President-Computer Services
R. Dixon Speas Associates, Inc.
Manhasset, New York 11030 (516) 627-7460

EXHIBIT V-8

SOUTHEAST WEATHER CONSULTANTS, INC.

- Southeast Weather Consultants, Inc. (SEW) is a private corporation of about 25 employees. While most interviewed airlines who use their services use them primarily to update U.S. Government weather data, SEW considers itself to be in the flight planning business as far as airlines are concerned, and do claim to provide complete flight plans, largely to executive jets (corporation aircraft).

- They charge $20 to $100 for overseas flight plans, depending on trip length and aircraft weight.

- SEW has no marketing office, and does no public relations.

- SEW also provides weather information in other industries, such as construction.

- Shorter plans, E.G. Atlanta to Mexico City, are about $50.

- Shortest plans are $15 to $20.

- SEW is not a significant competitor for UAL.

- SEW clients include:
  - Western
  - Southern
  - Capitol International
  - Unidentified corporate jet clients

Contact

Bob Higgens
General Manager
Southeast Weather Consultants, Inc.
P.O. Box 20637
Atlanta Airport Branch
Atlanta, CA. 30320

(404) 761-6991

EXHIBIT V-9

TWA

- TWA only sells flight planning as part of a complete dispatch service package. They have no sales force, and do not actively market their services. If they did sell more service, they would have to expand their DP center, which they are not willing to do because of their precarious financial condition.

- TWA looked at the flight planning market a few years ago and decided not to get seriously involved. They feel that Continental has sucessfully cornered the market.

- TWA provided us with a detailed description of a recent version of their systems. It is appended to this report. They continue to improve the system for internal use. Current improvements regard weather and fuel conservation.

- If in a couple of years, TWA turns around financially, and their improvements look good, they may have another look at the market.

- They currently have only 2 clients:

  - Olympic Airways
  - TranMediterranean Airways

  We have no interview data on either client.

- TWA uses its own system, and never evaluated an outside service company because "we understand our problems better than anybody else, and have the talent - so why not?"

Contact

Richard D. Pearson
Staff FP Commercial Development
TWA
Administrative Center
Kansas City, MO. 64153

(816) 464-6560

EXHIBIT V-10

UNITED AIR LINES

- Five UAL Clients have been interviewed. This section reviews their comments.

McCulloch International Airlines (Supplemental)

- Using UAL 1 year - Satisfied.
- Chose UAL over TWA, Continental, Lockheed and Southeast Weather, because UAL fits their needs best.
- Decline to discuss contract, but indicate flight plans cost $10 each.
- 400 plans in 1975.

Pacific Western Airlines Ltd. (Canada)

- Using UAL for international operations and charter flights for about 3 months.
- Satisfied.
- Pilots evaluated UAL and Continental about the same.
- Main advantage of UAL was format of flight plan.
- Declined to discuss price - sounded like $6 each.
- 3500 automated plans in 1976.
- United CRT feature is very good, they do not use it yet.

Quebecair (Canada)

- Using UAL for charters, since 11/74.
- Satisfied.
- 1000 plans in 1975 by computer at $10 per plan.
- UAL was chosen because of low price (compared to Air Canada), and easy communications.

Ranger Air Cargo

- Using UAL for over 1 year.
- Satisfied.
- Chose UAL over Continental and TWA because of other contract with UAL, and "CRT is teriffic."

Exhibit V-10 continued

- Would like automated flight following, approved by FAA. This appears to be quite important to supplementals and other small U.S. carriers.

Trans International Airlines, Inc.

- Using UAL for 1 year.
- "Beautifully" satisfied.
- 96,000 plans in 1975.
- Flat fee annual contract, including communications.
- Chose UAL over Continental and Lockheed. Used to be with Dixon Speas for 4 years - obsolete.
- Also have maintenance and ground handling contracts with UAL.

EXHIBIT V-11

OTHER VENDORS

- Air France - See Pan American.

- Braniff - only 1 regular client - Lybian Arab Republic.

- British Airways - no first hand information: Aviation Week reports British Airways supplies computer services to 29 major airlines doing departure control, message switching, maintenance control, flight planning, reservations and personnel records. Sales of software and communications in 1974 amounted to $3.2 million. Clients for various products and services are reported to include:

  - Al Italia (realtime software)
  - Eastern Air Lines (realtime software)
  - New Zealand National Airways (consulting and reservations)
  - Pan American (hotel reservations)
  - El Al Israel (consulting and departure control)
  - United Airlines (realtime software)
  - Swissair (realtime software)
  - TAP (reservations)

- CP Air
  - Just sold service to Eastern Provincial (Newfoundland)
  - Several years ago sold their software to Al Italia for $10-$15 thousand. Al Italia is now an Air France client.

- Japan Air Lines - claims not to sell their service. Air Siam claims to purchase their service.

- Lufthansa - thought to be a vendor - no clients encountered. No information from Lufthansa.

- Qantas - Malaysian Airlines claims to use their service.

- Sabena - thought to be a vendor, operates with Air France as a client.

- Varig - Thought to be a vendor - buys service from Continental.

VI. STRATEGIES AND OPPORTUNITIES FOR UAL

Product Strategies

- There is no indication from the marketplace of any dissatisfaction with the UAL product, or any specific items which are desirable but not available except:

  - A better weather information systems
  - Flight following for smaller airlines who might not want to buy flight planning

  Both of the above items are not available from any vendor, according to our research, but are in demand. As a consequence, if these were available from UAL, your market potential would be increased.

- Until the decision to become a major supplier of flight planning services is confirmed by UAL, marketing-oriented product development should be delayed. There is a great deal of market planning, testing, and development which should precede such investment. The current UAL product is more than adequate to increase market share. If it does not, there is low probability that improving the product will make a significant change.

- If UAL is indeed contemplating a $200,000 investment in product improvement, it should be done based on internal savings related to the half million flight plans generated for internal use, as well as with an eye to current and future market. Such an investment requires an incremental return of $52,760 per year in cost savings within UAL, or marginal profits after tax from outside sales.

- An internal cost saving of 10¢ per plan would justify the investment compared to a required increase in sales of 70,000 flight plans per year (assume 10% profit on an average $7.50 plan).

Marketing and Sales Promotion

- Clearly the most immediate steps to be taken in terms of increasing the external market volume are in marketing and sales promotion.

- The first requirement is an excellent brochure which describes the UAL flight planning system. Inasmuch as this means different things to different people, features and scope of activities need to be delineated in detail. Comparisons with the offerings of such competitors as Continental and Dixon Speas should be published. Comparisons with each other vendor should be available for each of the other vendors known clients.

- Inasmuch as most information is informally exchanged at professional meetings, your own flight operations staff should be able to collect the competitive information quickly and easily.

- The brochure should be mailed to at least three people in each target airline, including the VP of Flight Operations, the Chief Dispatcher and the Chief Pilot. Most decisions are made by committee. Direct mail has been indicated by these people as a desirable way for them to keep informed.

- All sales calls should be made by operations-experienced personnel. If possible, a second person, familiar with the technical details of the computer and communications system should also make the call.

- UAL should reconsider its lower limit of 350 miles for automation. Several smaller airlines are willing to automate over 250 miles, and will thus become prospects.

- UAL should formalize (if not yet already done) a policy regarding bundling of flight planning with other contract services. Most other vendors see flight planning as part of a package. On the other hand, Continental, thru Mutual Computer Services, aggressively markets flight planning as a stand alone as well as in combination with other EDP services. It would appear to be efficient, as a minimum, to combine the marketing of flight planning with reservations and other EDP offerings, with special pricing structures based on total annual dollar volume.

Keeping Tabs on the Market

- The flight planning market is volatile, and constant surveillance will pay off. In addition to collecting information at professional meetings, UAL pilots and other flying personnel can be instructed to periodically check in at airports - particularly those outside the U.S. - to inquire of other airlines operations personnel about current status, satisfactions, etc. An intelligence file on all airlines can easily be developed in less than one year. In only 2 months, INPUT has detailed the attitudes and volume levels of virtually all the US. and Canadian potential clients. The main work to be done is with foreign airlines.

- Constant feedback from existing clients is also critical, to deter them from becoming part of that volatile pool of defectors.

- A subscription to CAB's reports on contracts over $50,000 has been obtained by INPUT, including a record of the entire year 1975. The subscription should be maintained and tracked by UAL. Not only is information provided about what users are doing, but the contracts themselves provide otherwise confidential data about the competitors (particularly Continental).

- INPUT will forward the CAB data to UAL as part of this study.

Conclusions

- UAL can increase its market share by doing better sales promotion and market intelligence and research. Product improvement can wait.

- A $200,000 investment to improve the system should be based on current needs not to improve market share, unless a definite decision is made to become a significant supplier of flight planning services.

- UAL only has one serious competitor - Continental Air Lines via Mutual Computer Services.

INPUT

701 WELCH ROAD, SUITE 1119, PALO ALTO, CALIFORNIA, 94304 (415) 854-3422

ANALYSIS OF FLIGHT PLANNING ACTIVITIES

This is an international program to examine and evaluate flight planning activities at 150 airlines throughout the world. An analysis of the responses will be sent to all those who complete and return this questionnaire.

Please complete the applicable portions of this questionnaire, and provide the information below regarding the person to whom the analysis should be mailed.

Person's Name _____

Person's Title _____

Company Name _____

Address _____

_____

_____

Thank you for your cooperation and support. Please include a copy of your preferred flight plan and, if you will, a copy of your annual report. Return to:

Mr. Herb Seidman
INPUT
701 Welch Road
Suite 1119
Palo Alto, CA 94304
U.S.A.

(An Air Mail response would be appreciated)

Herb Seidman
INPUT Associate

INPUT

FLIGHT PLANNING SERVICES
QUESTIONNAIRE

1. Have you changed your operating philosophies because of the cost and/or availability of fuel?

____Yes ____No

2. How have these changes been reflected in your flight planning activities?

3. What do you expect will happen in the industry with respect to flight planning systems?

4. How do you presently accomplish your flight planning?

____Manually

____Other

Automated:

____In-house system

____Purchased service, from:

_____

NOTE: If currently automated, proceed to Question #8.

---

5. Why is your flight planning not automated?

____Cost;

____Uniqueness;

____Labor contract;

____Availability

Please explain:

6. Under what circumstances would you automate?

7. a) Are you presently considering automation? ____Yes ____No

   b) When might you actually automate? _____

   c) What form of automation are you likely to use?

   ____In-house system; ____Outside service; ____Other

   Please explain:

8. Where do you/would you go to get information about what is available in flight planning systems and services?

9. What is a reasonable price for a flight plan? $_____U.S. Dollars

10. How much does one of yours cost? $_____U.S. Including Communications

    $ U.S. Excluding Communications

11. How many flight plans will you prepare in 1975? _____

    1976? _____

    1980? _____

12. What time of day does your flight planning peak? _____ (GMT)

13. How many plans per hour do you prepare at this peak time? _____

14. Which communications system do you use to get your flight plans to their destination?

    ____ARINC ____SITA ____TELEX ____AFTN ____Other _____ (please specify)

15. a) What unique situations do you face in your flight planning operations?

    b) How well does your present system handle them?

End of Questionnaire for Non-Automated Firms
The following questions apply to automated flight plan users only

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16. What system do you currently have operational?

17. How long have you had it?

18. Are you satisfied with its performance? ____Yes ____No
If not, why not?

19. Do you have any plans, or ideas, for change? ____Yes ____ No
Please explain:

20. Did you evaluate any (other) flight planning services? ____Yes ____No

21. If yes, which ones?

22. What is your evaluation of available flight planning services?

23. Why did you select the system/service you are now using?

24. Would you use another system/service or change suppliers if:

a) Additional features were available at the same cost? ____Yes ____No

b) All the same features were available at lower cost? ____Yes ____No

c) How much lower would the cost have to be for you to change? _____%

25. On a scale of 1 to 5, (where 1=Not Important, and 5=Mandatory) indicate the importance of the following features of a flight planning system:

____Availability of a CRT terminal for the user to generate plans;

____Dial-up capability, instead of using leased lines;

____Reclear functions, particularly for international flights;

____Ability to generate inputs to the on-board navigational computer;

____Payload optimization for cargo trips;

____FIR boundaries indicated on flight plans;

____Provision of least fuel flight plan;

____Provision of equal time point computation;

____Calculation of "Ferry Fuel" requirements;

____ICAO-ATC flight plan summary;

____Flight plan format and content; (Please attach a copy of what you consider to be a preferred flight plan format)

____Other:

26. What three features of your current system are most important? (in order of importance)

1)

2)

3)

27. What features are missing from your present system?

28. What features would you like to see improved in your present system?

29. a) How long does it take from the time you supply the data to your system, until you receive your flight plan (turnaround time)?

_____

b) Is this an acceptable amount of time? ____Yes ____No

c) If not, what would be your desirable time? _____

30. Do you desire other applications support in conjunction with, or in addition to, flight planning, such as:

____Surface weather ____Flight following

____Other (explain)

31. a) Are there any new features planned for your system?

____Yes ____No

b) If, "Yes", what are they?

If you have an in-house flight planning system, please skip to question #42. If you use outside services, please continue.

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32. In selecting your service vendor, how important was each of the following items in making your choice? (1=Not important; 5 Most important)

____Price ____On-going support ____Initial training

____Features ____Documentation ____Turnaround Time

____Reliability ____Proven References ____Access Time

____Opportunity to purchase software for in-house processing

____Other:

33. How much support did you require during initial implementation? (for example, number of man-hours; amount of documentation, etc.)

34. How much support do you now require?

____Training ____Documentation

____Consulting ____Modifications

35. Has the support been satisfactory? ____Yes ____No

36. a) Who selected the service? _____
(Title)

b) Whose budget pays for it? _____

37. a) How is the service priced to you (unit price, annual contract, discounts for volume or tie-ins with other services, etc)?

b) Does this price include communications costs? ____Yes ____No

38. a) Approximately how much do you pay the vendor each month? $_____U.S. Dollars

b) How much would you expect to be paying each month, 5 years from now? $_____U.S. Dollars

39. When you selected your vendor, what characteristics of the company, were important to you (e.g., size, financial stability, etc)?

40. a) Which sales presentations stand out in your mind as being particularly good? Why?

b) Which sales presentations stand out in your mind as unsatisfactory? Why?

41. What advice would you offer to a company wishing to provide flight planning services to the airlines industry?

NOTE: The following questions are for in-house systems users only.

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42. a) Have you provided, or considered providing, your system to others? ____Yes ____No

b) If, "Yes", to whom?

c) How much did you/do you charge?

d) Why did you decide to offer your flight planning service to others?

e) Are you still providing the service? ____Yes ____No

f) If "No", why did you stop?

43. a) Have you considered using someone else's flight planning service? ____Yes ____No

b) If yes, please give details:

c) Have you considered using someone else's software on your system? ____Yes ____No

d) Please provide details:

44. What advice would you offer to a company wishing to provide flight planning services to the airlines industry?

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.
