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THE CRITICAL REALITIES

PRESENTATION BY
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THE CRITICAL REALITIES

INTRODUCTION

GOOD MORNING. I AM VERY PLEASED TO ONCE AGAIN HAVE THE OPPORTUNITY TO PARTICIPATE IN THIS FORUM. AS SOME OF YOU MAY RECALL, MY PRESENTATION LAST YEAR FOCUSED ON THE SUBJECT OF "MAJOR NEW FAA POLICY DIRECTIONS." IN THAT PRESENTATION, A NUMBER OF "DRIVING POLICY FORCES" WERE DISCUSSED INCLUDING: (Vu-graph 1)

- THE NATIONAL AVIATION SYSTEM AS AN OPEN SYSTEM
  THIS FORCE IS CAUSED BY THE "FISH BOWL" TYPE OF EXISTENCE THE FAA FINDS ITSELF IN TODAY. THUS, EVERY ACTION TAKEN, BE IT PROGRAMMATIC OR REGULATORY, IS VIEWED CRITICALLY FROM MANY VIEWPOINTS. ALTHOUGH MUCH GOOD HAS COME FROM THIS NEW FORCE, THE BY-PRODUCT TOO OFTEN HAS BEEN DELAY IN ACTIONS TAKEN.

OTHER SIMILAR POLICY-IMPACTING FORCES WERE TREATED, SUCH AS:

- NEW FEDERALISM, OR THE RELINQUISHMENT OF FEDERAL CONTROL TO STATE/LOCAL AUTHORITIES WHENEVER POSSIBLE.
- THE PHILOSOPHY OF COST ALLOCATION.
- INCREASED SYSTEM CAPACITY DEMAND.

- DIMINISHING RETURNS FROM TECHNOLOGY BREAKTHROUGHS (THEREBY LIMITING OPPORTUNITIES FOR SYSTEM CAPACITY EXPANSIONS).

- COST CONSCIOUSNESS IN GOVERNMENT.

- THE CONCERN FOR THE ENVIRONMENT; AND

- THE CONTINUED DEMAND FOR SYSTEM SAFETY.

IT WAS POINTED OUT AT THAT TIME THAT CERTAIN OF THESE "FORCES" DO NOT ALWAYS PULL IN THE SAME DIRECTION. AS AN EXAMPLE, THE ISSUE WAS RAISED CONCERNING THE RELINQUISHMENT OF CERTAIN FEDERAL AIRPORT RESPONSIBILITIES TO STATE OR LOCAL AUTHORITIES. THE TENETS OF NEW FEDERALISM WOULD ACT TO SUPPORT SUCH RELINQUISHMENT WHILE PROPONENTS OF THE FEDERAL POLICY COMMITMENT TO SAFEGUARD OUR ENVIRONMENT MIGHT SEE AN ABROGATION OF THAT COMMITMENT BY SUCH ACTION.

A FURTHER COMPARISON WAS MADE REGARDING THE FORCES OF COST-CONSCIOUSNESS AND INCREASED SYSTEM CAPACITY DEMAND. THE NOTION OF THESE TWO INTERACTING AND OPPOSING FORCES WAS THE BASIS FOR THE QUESTION REGARDING THE PROPER FEDERAL ROLE IN THE PROMOTION OF AVIATION, ESPECIALLY GENERAL AVIATION. THE AVIATION COMMUNITY WAS URGED TO ASSESS THESE OPPOSING FORCES AND PROVIDE THEIR THINKING AS TO THE TRADEOFFS BETWEEN THEM. THE REASON FOR THIS URGING WAS POINTED OUT IN SUBSEQUENT

SPEECHES TO BE THE FACT THAT THE EFFECTS OF EXISTING FORCES WERE ALREADY BECOMING OBVIOUS ON THE NATURE OF THE GENERAL AVIATION ACTIVITY AT THE LARGER AIR CARRIER AND GENERAL AVIATION AIRPORTS. G.A. ACTIVITY WAS SHOWN TO BE DIMINISHING AT A SAMPLING OF MAJOR AIRPORTS.

BUT WHY DID I FOCUS ON GENERAL AVIATION? WAS IT SIMPLY A MANIFESTATION OF SOME IMAGINARY VENDETTA THAT FAA HAS AGAINST G.A.? IT WOULD SEEM THAT THAT IS WHAT SOME BELIEVED. AS AN ILLUSTRATION, HERE IS PART OF THE FEEDBACK WE HAVE GOTTEN AS A RESULT OF OUR URGINGS:

FROM AOPA, FOR EXAMPLE, COMES THE FOLLOWING:

. "WHILE YOU CAREFULLY DID NOT ADVOCATE SUCH CONSTRAINTS, YOU NEVERTHELESS TREATED THE SUBJECT IN SUCH A MANNER AS TO LEAVE NO DOUBT IN THE MINDS OF YOUR LISTENERS THAT, IN FACT, YOU WERE ADVOCATING...CONSTRAINTS..."

MY REPLY TO THAT STATEMENT IS:

THAT I DID NOT EXPLICITLY OR IMPLICITLY ADVOCATE CONSTRAINTS. WHAT WAS SUGGESTED, HOWEVER, WAS THE POSSIBILITY THAT UNBRIDLED DEMAND MIGHT ONE DAY EXCEED FAA'S ABILITY TO MEET THAT DEMAND IN A <u>COST-EFFECTIVE</u>, <u>SAFE</u> MANNER. ACCORDINGLY, A SHIFT IN, OR CONSTRAINT ON THAT DEMAND MIGHT BE ONE VIABLE SOLUTION.

AGAIN FROM AOPA:

. "ONE OF THE CONSTRAINTS THAT IS BECOMING MORE TROUBLESOME AS TIME GOES ON IS THE PHILOSOPHY OF FAA THAT THE USERS MUST SERVE THE ATC SYSTEM RATHER THAN THE SYSTEM SERVING THE USERS."

THIS HAS NEVER BEEN A PHILOSOPHY OF FAA. WHAT IS AN FAA POSITION, HOWEVER, IS THAT THE USERS SHOULD EQUITABLY PAY FOR THE SYSTEM SERVICE THEY RECEIVE.

ANOTHER QUOTE FROM AOPA:

. "...THE ADMINISTRATOR IS DIRECTED BY THE CONGRESS (SECTION 305 OF THE FEDERAL AVIATION ACT OF 1958) 'TO ENCOURAGE AND FOSTER THE DEVELOPMENT OF CIVIL AERONAUTICS AND AIR COMMERCE IN THE UNITED STATES AND ABROAD.'"

THE ADMINISTRATOR IS CHARGED WITH OTHER CONCERNS AS WELL, e.g., THE SAFETY OF AIRCRAFT AND THE EFFICIENT UTILIZATION OF AIRSPACE. AS HAS ALREADY BEEN POINTED OUT, THE "PROMOTION" ASPECTS DO NOT NECESSARILY COMPLEMENT THESE OTHER CONCERNS AT ALL TIMES.

SOME OF THE COMMENTS RECEIVED PROVIDED CONSTRUCTIVE CRITICISM, WHILE AGREEING WITH THE FAA OBSERVATIONS. FROM EAA, FOR EXAMPLE, CAME THE FOLLOWING:

> MR. MEISTER SAID RECENTLY THAT GOVERNMENT CONSTRAINTS ON GENERAL AVIATION HAVE A SIGNIFICANT EFFECT ON ITS GROWTH. WE HERE AT EAA HEADQUARTERS HAVE RECOGNIZED THIS FOR MANY YEARS. HE FURTHER STATES - AND WE CERTAINLY AGREE WITH HIM - THAT GENERAL AVIATION IS BEING PUSHED OUT OF MAJOR AIRPORTS BY RISING COSTS OF OPERATION AND MAINTENANCE, AND IN ADDITION, THE AIR TRAFFIC CONTROL SYSTEM HAS CONSTRAINED THE NATURE OF THE DEMAND BY CAUSING A SHIFT OF PERSONAL USE AIRCRAFT FROM THE MAJOR AIR CARRIER AND GENERAL AVIATION AIRPORTS, TO THE LESS COSTLY AND LESS RESTRICTED RURAL AIRPORTS.

THIS COMMENTER CONTINUED FROM THIS POINT TO EXPRESS HIS ORGANIZATION'S STRONG OBJECTIONS TO THE PROCESS THAT IS CAUSING THIS TO HAPPEN, BUT AS CAN BE SEEN, HE DOES NOT CLAIM THAT THE PROBLEM DOES NOT EXIST OR THAT THE FAA OBSERVATIONS ARE WRONG.

BUT LET ME RETURN TO THE CENTRAL QUESTION. WHY DID I FOCUS ON GENERAL AVIATION THEN? AND WHY DO I REPEAT THAT EMPHASIS NOW?

HERE ARE THE REASONS:

. GENERAL AVIATION AIRCRAFT ACCOUNT FOR APPROXIMATELY 98 PERCENT OF ALL ACTIVE CIVIL AIRCRAFT IN THE UNITED STATES.

- IN RECENT YEARS, MORE SOPHISTICATION AND COMPLEXITY HAVE BEEN EVIDENCED IN THE GENERAL AVIATION FLEET. FOR EXAMPLE, THE SINGLE ENGINE PISTON AIRCRAFT HAS ALWAYS CONSTITUTED THE MAJOR PORTION OF THE G.A. FLEET. IN 1960 THERE WERE 68,000 SUCH AIRCRAFT REPRESENTING 90 PERCENT OF ALL G.A. AIRCRAFT. HOWEVER, BY 1975, ALTHOUGH THIS NUMBER GREW TO 132,000, THE SINGLE ENGINE PISTON AIRCRAFT HAD DROPPED TO 82 PERCENT OF ALL G.A. AIRCRAFT.

- GENERAL AVIATION OPERATIONS CONSTITUTE AN INCREASING PROPORTION OF TOTAL OPERATIONS. BY 1975, G.A. ACCOUNTED FOR ABOUT 76 PERCENT OF ALL OPERATIONS AT TOWERED AIRPORTS; AIR TAXI, 5 PERCENT; AIR CARRIER, 15 PERCENT; AND MILITARY, 4 PERCENT.

- ITINERANT OPERATIONS AT TOWERED AIRPORTS ACCOUNT FOR ABOUT 63 PERCENT OF ALL OPERATIONS AND, IN 1975, G.A. ITINERANT OPERATIONS ACCOUNTED FOR 65 PERCENT OF <u>ALL</u> ITINERANT OPERATIONS.

- THE GROWTH IN INSTRUMENT OPERATIONS REFLECTS THE INCREASED USE OF AVIONICS EQUIPMENT BY THE G.A. PILOT. BY 1975, GENERAL AVIATION INSTRUMENT OPERATIONS ACCOUNTED FOR 43 PERCENT OF ALL INSTRUMENT OPERATIONS, TOTALING 11.6 MILLION OPERATIONS. IN THE SAME YEAR, AIR CARRIER REPRESENTED 35 PERCENT; MILITARY 14 PERCENT; AND AIR TAXI 7 PERCENT OF INSTRUMENT OPERATIONS.

. AND, FINALLY, ALMOST ALL LOCAL OPERATIONS ARE ATTRIBUTABLE TO G.A. (OVER 20 MILLION SUCH G.A. OPERATIONS OCCURRED IN 1975, OR ABOUT 94 PERCENT OF ALL LOCAL OPERATIONS).

THESE THEN ARE SOME OF THE REASONS I HAVE FOCUSED ON GENERAL AVIATION IN THE PAST. THIS IS WHERE THE ACTION IS. AND, IF WE ARE TO MEET THE CHALLENGES OF THE FUTURE, THIS IS WHERE OUR ATTENTION MUST FOCUS NOW. THIS, LADIES AND GENTLEMEN, IS ONE OF THE CRITICAL REALITIES WE MUST FACE.

RECENT STUDY ACTIVITY UNDERTAKEN BY FAA

SO FAR, I HAVE ONLY EXPANDED UPON MY PAST STATEMENTS AND HAVE RESPONDED TO SPECIFIC REACTIONS BY GENERAL AVIATION INDUSTRY REPRESENTATIVES. ACCORDINGLY, THESE COMMENTS HAVE "PLOWED NO NEW GROUND" ON THE VERY SERIOUS SUBJECT OF GENERAL AVIATION. WHAT HAS BEEN RECONFIRMED, HOWEVER, IS SOMETHING THAT ALL SIDES AGREED TO IN THE FIRST PLACE. NAMELY, THAT GENERAL AVIATION HAS SPECIAL CONCERNS. BEYOND THAT, THE CAUSES AND SOLUTIONS TO THOSE CONCERNS REMAIN HOTLY DISPUTED.

IN AN ATTEMPT TO SHED FURTHER LIGHT ON THE NATURE OF THE CURRENT FORCES IMPACTING G.A., WE HAVE UNDERTAKEN EXTENSIVE ANALYSIS OF THE ENTIRE SPECTRUM OF G.A. ACTIVITY. A PART OF THAT EFFORT IS REPRESENTED IN THE SUPPLEMENTARY DATA PACKAGE ATTACHED TO COPIES OF MY PRESENTATION WHICH HAS BEEN MADE AVAILABLE TO ARC PARTICIPANTS.

THE GENERAL AVIATION STATISTICAL OVERVIEW I PROVIDED EARLIER WAS EXTRACTED FROM THIS SUPPLEMENTARY DATA PACKAGE.

AFTER THAT OVERVIEW MATERIAL WAS GATHERED, WE ANALYZED DIFFERENT CATEGORIES OF AIR CARRIER AIRPORTS TO ASCERTAIN WHETHER THE ROLE OF GENERAL AVIATION CHANGED SIGNIFICANTLY BETWEEN CATEGORIES. THIS WAS DONE TO TEST OUR PREVIOUS FINDINGS ON ONLY A RELATIVELY SMALL NUMBER OF AIRPORTS. TO GET BETTER STATISTICAL RELIABILITY, WE ANALYZED AIRPORTS RANKED 1-20 IN 1975 AIR CARRIER OPERATIONS, AS WELL AS AIRPORTS RANKED 71-90 AND 131-150.

THE AIRPORTS WITHIN THESE VARIOUS RANKINGS ARE SHOWN IN THE FOLLOWING VU-GRAPHS:

(Vu-graphs 2, 3, 4)

OF SIGNIFICANCE ARE THE FOLLOWING FINDINGS FROM THIS ANALYSIS:

(Vu-graph 5)

- IN 1975, THE 20 AIRPORTS WITH THE LARGEST AMOUNT OF AIR CARRIER ACTIVITY ACCOUNTED FOR OVER 48 PERCENT OF ALL AIR CARRIER OPERATIONS; AIRPORTS RANKED 71 TO 90 ACCOUNTED FOR 5 PERCENT OF AIR CARRIER ACTIVITY; AND AIRPORTS RANKED 131 TO 150 ACCOUNTED FOR ONLY 2.4 PERCENT OF AIR CARRIER ACTIVITY. THE TOP 150 AIRPORTS TOGETHER ACCOUNT FOR ALMOST ALL AIR CARRIER OPERATIONS (93 PERCENT).

AT THE TOP 20 AIRPORTS:

- TOTAL OPERATIONS INCREASED BY 41 PERCENT BETWEEN 1960 AND 1975. AIR CARRIER OPERATIONS INCREASED BY 64 PERCENT DURING THIS PERIOD AND GENERAL AVIATION OPERATIONS, INCLUDING AIR TAXI, INCREASED 23 PERCENT.

- ALTHOUGH GENERAL AVIATION OPERATIONS, INCLUDING AIR TAXI, INCREASED BY ONLY 1 PERCENT DURING THE 1972-1975 PERIOD, AIR TAXI OPERATIONS ALONE GREW 38 PERCENT. DURING THE SAME PERIOD, GENERAL AVIATION ALONE DECLINED 12 PERCENT, AND AIR CARRIER DECLINED 7 PERCENT.

- LOCAL OPERATIONS DECREASED BY 78 PERCENT OVER THE LAST 15 YEARS. GENERAL AVIATION LOCAL OPERATIONS DECLINED 75 PERCENT.

- IN 1975, GENERAL AVIATION OPERATIONS ACCOUNTED FOR 18.5 PERCENT OF ALL OPERATIONS AT THESE 20 AIRPORTS, COMPARED WITH 76 PERCENT OF OPERATIONS AT ALL TOWERED AIRPORTS. CONVERSELY, AIR CARRIER OPERATIONS REPRESENTED 70 PERCENT OF TOTAL OPERATIONS, AS COMPARED WITH 15 PERCENT NATIONALLY.

AT THE AIRPORTS RANKED 71-90:

- TOTAL OPERATIONS INCREASED BY 50 PERCENT DURING THE 1960-1975 PERIOD. GENERAL AVIATION OPERATIONS,

INCLUDING AIR TAXI, INCREASED 98 PERCENT, WHILE AIR CARRIER OPERATIONS INCREASED BY ONLY 6 PERCENT.

. FROM 1972 TO 1975, THE NUMBER OF AIR TAXI OPERATIONS GREW OVER 47 PERCENT. GENERAL AVIATION ALONE, EXCLUDING AIR TAXI, INCREASED 15 PERCENT DURING THE SAME PERIOD, WHILE AIR CARRIER OPERATIONS DECLINED 10 PERCENT.

. TOTAL LOCAL OPERATIONS (GENERAL AVIATION AND MILITARY) INCREASED BY 56 PERCENT DURING THE 1960 TO 1975 PERIOD AT THESE AIRPORTS. GENERAL AVIATION LOCAL OPERATIONS INCREASED 100 PERCENT.

. IN 1975, GENERAL AVIATION OPERATIONS REPRESENTED 73.9 PERCENT OF TOTAL OPERATIONS. THIS IS APPROXIMATELY THE SAME PROPORTION AS THE PROPORTION OF GENERAL AVIATION AT TOWERED AIRPORTS ON A NATIONAL LEVEL (76 PERCENT). SIMILARLY, AIR CARRIER OPERATIONS ACCOUNTED FOR 13 PERCENT OF ALL OPERATIONS AT THESE AIRPORTS AND 15 PERCENT OF ALL OPERATIONS NATIONALLY. AIR TAXI OPERATIONS ACCOUNTED FOR 5 PERCENT OF ALL OPERATIONS NATIONALLY AND AT THESE AIRPORTS.

<u>AT THE AIRPORTS RANKED 131-150</u>:

FOR THE PERIOD 1960 TO 1975:

- TOTAL OPERATIONS INCREASED 70 PERCENT.

- GENERAL AVIATION, INCLUDING AIR TAXI, INCREASED 119 PERCENT.

- AIR CARRIER OPERATIONS DECLINED 10.5 PERCENT.

FROM 1972 TO 1975:

- AIR TAXI OPERATIONS DECLINED 6.4 PERCENT.

- GENERAL AVIATION, EXCLUDING AIR TAXI, INCREASED 9.6 PERCENT.

- AIR CARRIER OPERATIONS DECREASED 5.8 PERCENT.

IN 1975:

- GENERAL AVIATION OPERATIONS REPRESENTED 80 PERCENT OF TOTAL OPERATIONS, COMPARED WITH 76 PERCENT NATIONALLY.

- AIR CARRIER OPERATIONS REPRESENTED 9.2 PERCENT OF TOTAL OPERATIONS, COMPARED WITH 15 PERCENT NATIONALLY.

- AIR TAXI OPERATIONS REPRESENTED 2 PERCENT OF TOTAL OPERATIONS, COMPARED WITH 5 PERCENT NATIONALLY.

- LOCAL OPERATIONS ACCOUNTED FOR 40.5 PERCENT OF TOTAL OPERATIONS, COMPARED WITH 37 PERCENT NATIONALLY.

VU-GRAPH 5 SUMMARIZES THE ACTIVITY LEVELS FOUND AT THE SELECTED CATEGORIES OF AIRPORTS:

(Vu-graph 6)

VU-GRAPH 6 DEPICTS THE DIFFERENCES IN THE PERCENTAGE CHANGE IN GENERAL AVIATION OPERATIONS BETWEEN 1960-1975 AT ALL TOWERED AIRPORTS, AND AT AIRPORTS RANKED 1-20, 71-90 AND 131-150 IN 1975 AIR CARRIER OPERATIONS. IT SHOULD BE NOTED THAT THE GROWTH CURVE FOR GENERAL AVIATION OPERATIONS AT ALL TOWERED AIRPORTS IS BIASED DUE TO AN EVER INCREASING NUMBER OF TOWERED AIRPORTS BETWEEN 1960-1975.

BUT WHY IS G.A. SHIFTING THE WAY IT IS?

IN AN ATTEMPT TO GAIN MORE PRECISE INSIGHT AS TO THE CAUSE OF THIS SHIFT IN G.A. GROWTH AWAY FROM THE LARGE AIRPORTS, INDIVIDUAL AIRPORTS WERE ANALYZED WITHIN EACH OF THE THREE SPECIFIED CATEGORIES.

ALTHOUGH CONCLUSIVE PROOF COULD NOT BE GAINED AS TO WHICH FACTORS MOST INFLUENCED THESE SHIFTS, INDICATIONS ARE THAT CERTAIN FACTORS ARE LIKELY CONTRIBUTORS TO INHIBITED G.A. GROWTH AT LARGE AIR CARRIER AIRPORTS. THESE FACTORS INCLUDE:

- EXISTENCE OF LANDING FEES
- HIGH FUEL COSTS OR POOR AVAILABILITY OF FUEL
- HIGH COSTS OR NO AVAILABLE VACANCIES ASSOCIATED WITH TIE-DOWN FACILITIES
- HIGH DELAY IN TERMINAL PROCEDURES INCURRED BY G.A.

ADDITIONAL INHIBITING FACTORS

TO BE SURE, THERE EXIST A NUMBER OF ADDITIONAL FORCES THAT ARE SEEN AS CURRENT INHIBITORS OR POTENTIAL FUTURE INHIBITORS OF G.A. ON A NATIONAL LEVEL. THESE FORCES INCLUDE:

. REGULATORY REQUIREMENTS, SUCH AS:

- REVISED PILOT CERTIFICATION REQUIREMENTS
- TCA REQUIREMENTS
- INCREASED APPROACH SEPARATIONS
- EMERGENCY LOCATOR TRANSMITTER REQUIREMENTS
- VOICE/FLIGHT DATA RECORDER REQUIREMENTS, AND
- TRANSPONDER REQUIREMENTS

OTHER POTENTIAL FORCES ARE REPRESENTED BY:

. LEGISLATIVE ACTIONS, SUCH AS:

- POSSIBLE USER CHARGE MODIFICATIONS.

ADDITIONAL REQUIRED ANALYSIS IDENTIFIED

IN LIGHT OF THE FINDINGS OF OUR ANALYSES TO DATE, TOGETHER WITH THE LIKELIHOOD OF CONTINUED EMPHASIS ON PRUDENT GOVERNMENT SPENDING, IT DID NOT SEEM UNREASONABLE FOR US TO ASK THE FOLLOWING QUESTIONS:

(1) WILL THE CURRENT SYSTEM MECHANISMS (REGULATION, ECONOMICS,

ET.AL.) AUTOMATICALLY ADJUST FOR THE INCREASED DEMANDS ON THE SYSTEM? IF SO, CAN FURTHER ERODING OF G.A. ACTIVITY AT LARGE AIRPORTS BE EXPECTED?

(2) ARE THE CURRENT SYSTEM MECHANISMS OPTIMAL OR ARE OTHER ACTIONS MORE EFFECTIVE?

(3) IF FUTURE DEMAND CANNOT BE MET IN A SAFE, COST-EFFECTIVE WAY, WHAT OTHER ACTIONS SHOULD BE CONSIDERED?

- PEAK HOUR RESTRICTIONS ON ACTIVITY AT LARGE AIR CARRIER AIRPORTS?

- VARIABLE LANDING FEES IMPOSED ON ALL AIRCRAFT AT LARGE AIR CARRIER AIRPORTS WITH PEAK HOUR OPERATIONS COSTING THE MOST? (AS AN ASIDE, IT SHOULD BE NOTED THAT CEQ HAS ASKED THAT "NON-CONSTRUCTION" ACTIONS SUCH AS VARIABLE LANDING FEE IMPLEMENTATION BE STUDIED AS A POSSIBLE ALTERNATIVE TO NEW AIRPORT CONSTRUCTION.)

- RESTRUCTURING OF THE LEVEL OF SERVICE PROVIDED TO GENERAL AVIATION TO BRING ABOUT A MORE EQUITABLE BALANCE BETWEEN BENEFITS RECEIVED BY G.A. AND COSTS PAID BY G.A. FOR THOSE BENEFITS?

  -- IF SERVICE RESTRUCTURING IS A SOLUTION, WHAT LEVELS OF SERVICE SHOULD BE CONSIDERED AT AIRPORTS? AT FSS'S? IN THE AIRSPACE?

LET ME EMPHASIZE HERE, THAT THESE QUESTIONS DO NOT REPRESENT ADVOCACY BUT RATHER TOUCH UPON AREAS WHERE WE FEEL FUTURE OBJECTIVE POLICY DEVELOPMENT MAY LEAD US.

OTHER QUESTIONS INCLUDE:

(4) WHAT ARE THE TRADEOFFS BETWEEN INSURING "EFFICIENT UTILIZATION OF...AIRSPACE" AND "ENCOURAGING AND FOSTERING THE DEVELOPMENT OF CIVIL AERONAUTICS..."?

(5) IF THE EXISTING MARKETPLACE MECHANISMS ARE NOT ACCOMMODATING THE NEEDS OF G.A. AT THE LARGER AIR CARRIER AIRPORTS, SHOULD THE FEDERAL GOVERNMENT MOVE INTO THOSE AREAS? I.E., CALL FOR GUARANTEED G.A. TIE-DOWN FACILITIES AT AIRPORTS RECEIVING FEDERAL FUNDING; REQUIRE PILOT TRAINING FACILITIES; ET.AL.

(6) IF THE PRESENT COST STRUCTURE IS MODIFIED, HOW CAN THAT STRUCTURE BEST BE IMPLEMENTED WITHOUT IMPOSING THE BURDEN OF ADDITIONAL COSTS ON THOSE ELEMENTS OF GENERAL AVIATION THAT DO NOT DESIRE OR REQUIRE SOPHISTICATED SERVICES?

TO GET A GRIP ON THESE QUESTIONS AND TO OBTAIN RESPONSIVE POLICY DEVELOPMENT FURTHER REQUIRE ADDITIONAL DATA AND INFORMATION IN THE FOLLOWING AREAS:

A. <u>GENERAL AVIATION ELASTICITIES</u>

SPECIFICALLY:

(1) TO WHAT DEGREE DOES AVAILABILITY OF SERVICES RELATE TO GENERAL AVIATION ACTIVITY AT A GIVEN AIRPORT, I.E., FBO'S, FUEL, TRAINING, TIE-DOWN FACILITIES, GROUND ACCESS?

(2) TO WHAT DEGREE DOES PROXIMITY OF THE AIRPORT TO THE CENTRAL BUSINESS DISTRICT RELATE TO GENERAL AVIATION ACTIVITES?

(3) WHAT ARE THE ELASTICITIES RELATED TO LANDING FEES? (AT WHAT POINT WILL THE PRIMARY AIRPORT LOCATION WITH A LANDING FEE BE REJECTED BY THE G.A. USER FOR A LESS GEOGRAPHICALLY OPTIMAL LOCATION WITH A LESSER OR NO LANDING FEE?)

(4) IF UNAVAILABILITY OF SERVICE, SYSTEM COST AND REGULATORY RESTRICTIONS WERE NOT INHIBITING FACTORS, HOW MUCH INCREASED G.A. ACTIVITY WOULD OCCUR AT THE LARGE AIR CARRIER AIRPORTS?

B. GENERAL AVIATION SERVICE REQUIREMENTS

ELEMENTS WITHIN G.A. HAVE OFTEN CONTENDED THAT THE SOPHISTICATION OF THE SYSTEM AS NOW CONSTITUTED IS PRIMARILY FOR THE BENEFIT OF THE AIR CARRIERS, NOT THE GENERAL AVIATION USER. THEREFORE:

(1) WHAT EXISTING NONSAFETY RELATED SERVICES OR REQUIREMENTS SHOULD BE MODIFIED AS THEY RELATE TO G.A. AND HOW?

(2) WHAT NEW G.A. SERVICES SHOULD FAA PROVIDE AT THE AIRPORT AND IN THE AIRSPACE?

THE ABOVE ARE THE DATA GAPS AND INFORMATION REQUIREMENTS WE PERCEIVE IN JUST TWO GENERIC AREAS.

SOME OF THE EARLY FINDINGS

IN AN ATTEMPT TO AT LEAST PARTIALLY ADDRESS SOME OF THE DATA GAPS AND QUESTIONS WE FORMULATED, WE MADE USE OF A RECENTLY DEVELOPED GENERAL AVIATION MODEL WHICH RELATED G.A. REGULATORY OR COST IMPACTS TO MEASURES OF G.A. ACTIVITY.

HERE ARE SOME OF THE EARLY RESULTS:

. IN THE AREA OF G.A. ELASTICITIES, WE DETERMINED THAT A 20 PERCENT INCREASE IN FUEL AND OIL COSTS WOULD HAVE THE FOLLOWING EFFECTS IF IMPOSED IN 1976:

(Vu-graph 7)

- IT WOULD REDUCE THE TOTAL NUMBER OF ANTICIPATED G.A. FLIGHT HOURS IN 1977 ALONE BY 8.5 PERCENT FROM 38.9 MILLION HOURS TO 35.6 MILLION HOURS. [PERSONAL USE WOULD BE HARDEST HIT WITH A REDUCTION OF 12.4 PERCENT, FROM 10.1 MILLION HOURS TO 8.9 MILLION HOURS; AND IN THAT

(Vu-graph 8)

CATEGORY THE SINGLE ENGINE PISTON AIRCRAFT (FOUR SEAT AND OVER) WOULD RECEIVE THE GREATEST NUMERICAL IMPACT WITH A REDUCTION OF OVER 900,000 HOURS OF FLYING TIME.]

THIS SITUATION MIGHT BE BROUGHT ABOUT, FOR EXAMPLE, BY EITHER A GENERAL FUEL/OIL COST INCREASE OR BY ACTION OF AIRPORT MANAGEMENT AS A SURROGATE MEANS TO RECOVER LANDING FEES.

(Vu-graph 9)

. ON A SUBJECT RELATED TO THE AVAILABILITY OF FBO'S WE ANALYZED THE IMPACT OF A 20 PERCENT INCREASE IN AIRFRAME MAINTENANCE ON TOP OF THE HYPOTHETICAL 20 PERCENT INCREASE IN FUEL AND OIL COSTS. SUCH AN INCREASE IN AIRFRAME MAINTENANCE COST COULD COME ABOUT AS A RESULT OF REDUCED NUMBERS OF FBO SERVICES CAUSING LESS COMPETITION AND GREATER PHYSICAL INCONVENIENCE TO G.A. OWNERS. ADDITIONALLY, TRENDS TOWARD MORE SOPHISTICATED G.A. AIRCRAFT (PREVIOUSLY DISCUSSED) COULD ALSO REINFORCE THIS FACTOR. THIS ADDITIONAL HYPOTHETICAL INCREASE, WHEN COMPOUNDED BY THE FUEL/OIL COST INCREASE, WOULD RESULT IN:

- AN OVERALL 12.4 PERCENT REDUCTION IN G.A. FLYING HOURS IN 1977 BELOW THE LEVEL CURRENTLY ANTICIPATED. AGAIN, "PERSONAL USE" FLYING WOULD SUSTAIN THE BRUNT

OF THIS IMPACT WITH A REDUCTION OF 17.4 PERCENT OR OVER 1.7 MILLION LESS FLYING HOURS THAN PRESENTLY ANTICIPATED IN 1977.

IT IS INTERESTING TO NOTE THAT CERTAIN ELEMENTS OF G.A. FLYING ARE LESS IMPACTED BY THESE HYPOTHETICAL COST INCREASES THAN OTHERS. ADDITIONALLY, CROSS-OVERS OR TRANSFERS OF GENERAL AVIATION FLYING ARE SEEN TO OCCUR AT THE EXPENSE OF THE MORE COST-SENSITIVE CATEGORIES SUCH AS "PERSONAL USE" AND "INSTRUCTIONAL" FLYING.

(Vu-graph 10)

. ON THE QUESTION OF "PROMOTION OF AVIATION," WE FOUND THAT IF WE COULD REALIZE A REDUCTION IN G.A. TERMINAL DELAYS (EITHER BY OPERATIONAL, REGULATORY OR PROGRAMMATIC IMPROVEMENTS) SO THAT THE COSTS OF FLYING, E.G., FUEL AND OIL, WERE REDUCED BY 5 PERCENT BY THE END OF 1976, THE FOLLOWING WOULD OCCUR:

- IN 1977 ALONE, FLYING HOURS OF ALL G.A. AIRCRAFT WOULD EXCEED CURRENTLY ANTICIPATED LEVELS BY 3.7 PERCENT OR OVER 1.4 MILLION HOURS. AGAIN, "PERSONAL" USE FLYING WOULD SUSTAIN THE GREATEST NUMERICAL IMPACT WITH AN INCREASE OF OVER 500 THOUSAND ADDITIONAL HOURS.

OF COURSE, THIS IMPACT WOULD THEN HAVE TO BE WEIGHED AGAINST THE COSTS OF WHATEVER REGULATORY, OPERATIONAL OR

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PROGRAMMATIC ACTIONS WOULD BE NECESSITATED. THIS GETS US INTO THE QUESTION OF TRADE-OFFS BETWEEN "EFFICIENT UTILIZATION" OF THE AIRSPACE, "PROMOTION" OF AVIATION AND COST EFFECTIVENESS.

IT STILL REMAINS FOR US TO DISTRIBUTE THESE HYPOTHETICAL INCREASES OR DECREASES TO LOWER LEVELS OF AGGREGATION. THIS MUST BE DONE TO IDENTIFY THE AIRPORTS HAVING POTENTIAL FUTURE PROBLEMS OF AIRSIDE CAPACITY/DELAY, NOISE, GROUND ACCESS AND SO FORTH. IN ORDER TO ACCOMPLISH THIS, MANY SITE-SPECIFIC FACTORS MUST BE TAKEN INTO CONSIDERATION, SUCH AS THE EXISTENCE OR FUTURE POTENTIAL NEED FOR TCA'S.

AS AN ASIDE, WE HAVE JUST COMPLETED A SURVEY OF GENERAL AVIATION AIRCRAFT OWNERS IN CONJUNCTION WITH THE CENSUS BUREAU. AS A RESULT OF A 6 PERCENT SAMPLING, WE LEARNED THAT ONLY 3.6 PERCENT OF THE SINGLE ENGINE PISTON, ONE TO THREE SEAT AIRCRAFT AND ONLY 21.2 PERCENT OF THE SINGLE ENGINE PISTON WITH FOUR OR MORE SEATS ARE CURRENTLY TRANSPONDER EQUIPPED. THUS THE EXISTENCE OF A TCA AT A SPECIFIC AIRPORT HAS TREMENDOUS BEARING ON THE FUTURE GROWTH OF G.A. AT THAT AIRPORT SINCE THE SINGLE ENGINE PISTON AIRCRAFT CURRENTLY REPRESENTS 82 PERCENT OF THE ENTIRE G.A. FLEET. THIS VIEWPOINT, BY THE WAY, WAS SIMILARLY EXPRESSED BY G.A. REPRESENTATIVES AT A "LISTENING SESSION" SPONSORED BY OUR CENTRAL REGION OFFICE JUST LAST MONTH.

SUMMARY REMARKS

OBVIOUSLY WE HAVE MUCH WORK LEFT TO BE ACCOMPLISHED IN ANSWERING THE SERIES OF QUESTIONS WE HAVE ALREADY POSED AND THIS LISTING IS NOT IN THE LEAST INTENDED TO BE EXHAUSTIVE. TO PROVIDE THE SYSTEM CAPABILITY, WHEN NEEDED, IN THE SAFEST, MOST COST-EFFECTIVE MANNER REQUIRES A TOTAL INDUSTRY EFFORT IN FIRST ANSWERING THESE QUESTIONS. THIS, LADIES AND GENTLEMEN, IS THE MOST CRITICAL REALITY OF ALL.

ACCORDINGLY, I AM SCHEDULING A FOLLOW-UP GENERAL AVIATION CONSULTATIVE PLANNING CONFERENCE TENTATIVELY SET FOR EARLY SEPTEMBER AT WHICH TIME THE INDUSTRY IS ASKED TO DEVELOP THEIR INPUT TO THESE QUESTIONS AND RAISE OTHERS THEY FEEL REQUIRE OUR JOINT IMMEDIATE ATTENTION. IF THE SUPPLEMENTARY DATA PACKAGE YOU WILL RECEIVE CAN BE USED AS A SPRINGBOARD TO DEVELOP THAT FORUM, IT WILL HAVE SERVED ITS PURPOSE. THE DETAILS OF THE CONFERENCE WILL BE PUBLICIZED IN THE FEDERAL REGISTER AS QUICKLY AS POSSIBLE.

LET'S PUT ASIDE PAST MISUNDERSTANDINGS AND PULL TOGETHER IN THIS EFFORT. THE COSTS OF DOING OTHERWISE ARE PROHIBITIVE.

THANK YOU.

VU-GRAPH 1

DRIVING POLICY FORCES IMPACTING AVIATION

- THE NATIONAL AVIATION SYSTEM AS AN "OPEN SYSTEM"
- NEW FEDERALISM
- COST ALLOCATION
- INCREASED SYSTEM CAPACITY DEMAND
- DIMINISHING TECHNOLOGY BREAKTHROUGHS
- COST CONSCIOUSNESS
- ENVIRONMENTAL CONCERNS
- SAFETY

VU-GRAPH 2

AIRPORTS RANKED 1-20 IN AIR CARRIER OPERATIONS 1975

Rank	Airport	Rank	Airport
1	Chicago O'Hare Int'l. Chicago, IL	11	Washington National Washington, DC
2	Atlanta International Atlanta, GA	12	St. Louis International St. Louis, MO
3	Los Angeles Int'l. Los Angeles, CA	13	Pittsburgh Greater Int'l. Pittsburgh, PA
4	John F. Kennedy Int'l. New York, NY	14	Detroit Metro. Wayne County Detroit, MI
5	Dallas-Ft. Worth Regional Dallas, TX	15	Philadelphia Int'l. Philadelphia, PA
6	San Francisco Int'l. San Francisco, CA	16	Minneapolis-St. Paul Int'l. Minneapolis, MN
7	La Guardia New York, NY	17	Newark Newark, NJ
8	Miami International Miami, FL	18	Houston Intercontinental Houston, TX
9	Boston, Logan Boston, MA	19	Cleveland Hopkins Int'l. Cleveland, OH
10	Denver Stapleton Int'l. Denver, CO	20	Seattle-Tacoma Int'l. Seattle, WA

VU-GRAPH 3

AIRPORTS RANKED 71-90 IN AIR CARRIER OPERATIONS 1975

Rank	Airport	Rank	Airport
71	El Paso International EL Paso, TX	81	Lihue Lihue, HI
72	Albany County Albany, NY	82	Green Bay, Austin Straubel Green Bay, WI
73	Greensboro Regional Greensboro, NC	83	Providence Providence, RI
74	Orange County Santa Ana, CA	84	Grand Rapids Grand Rapids, MI
75	Wichita Mid-Continent Wichita, KS	85	Reno International Reno, NV
76	Little Rock, Adams Field Little Rock, AR	86	Bristol Tri-City Bristol, TN
77	Jackson Municipal Airport Jackson, MS	87	Hilo, General Lyman Field Hilo, HI
78	Richmond Byrd Int'l. Richmond, VA	88	Mobile, Bates Field Mobile, AL
79	Madison Madison, WI	89	Charleston AFB Municipal Charleston, SC
80	Sioux Falls, Foss Field Sioux Falls, SD	90	Fairbanks Fairbanks, AK

AIRPORTS RANKED 131-150 IN AIR CARRIER OPERATIONS 1975

Rank	Airport	Rank	Airport
131	Lincoln Municipal Lincoln, NE	141	Wilmington, New Hanover Co. Wilmington, NC
132	Baton Rouge, Ryan Field Baton Rouge, LA	142	Kalamazoo Kalamazoo, MI
133	Burlington International Burlington, VT	143	Springfield Springfield, MO
134	Nantucket Memorial Nantucket, MA	144	Casper Casper, WY
135	Waterloo Waterloo, IA	145	Fort Wayne Fort Wayne, IN
136	Middleton Middleton, PA	146	Newport News Newport News, VA
137	Huntington Huntington, WV	147	Monroe Monroe, LA
138	Daytona Beach Daytona Beach, FL	148	Saginaw Tri-City Saginaw, MI
139	Evansville Evansville, IN	149	Winston-Salem, Smith-Reynolds Winston-Salem, NC
140	South Bend South Bend, IN	150	Bismarck Bismarck, ND

VU-GRAPH 5

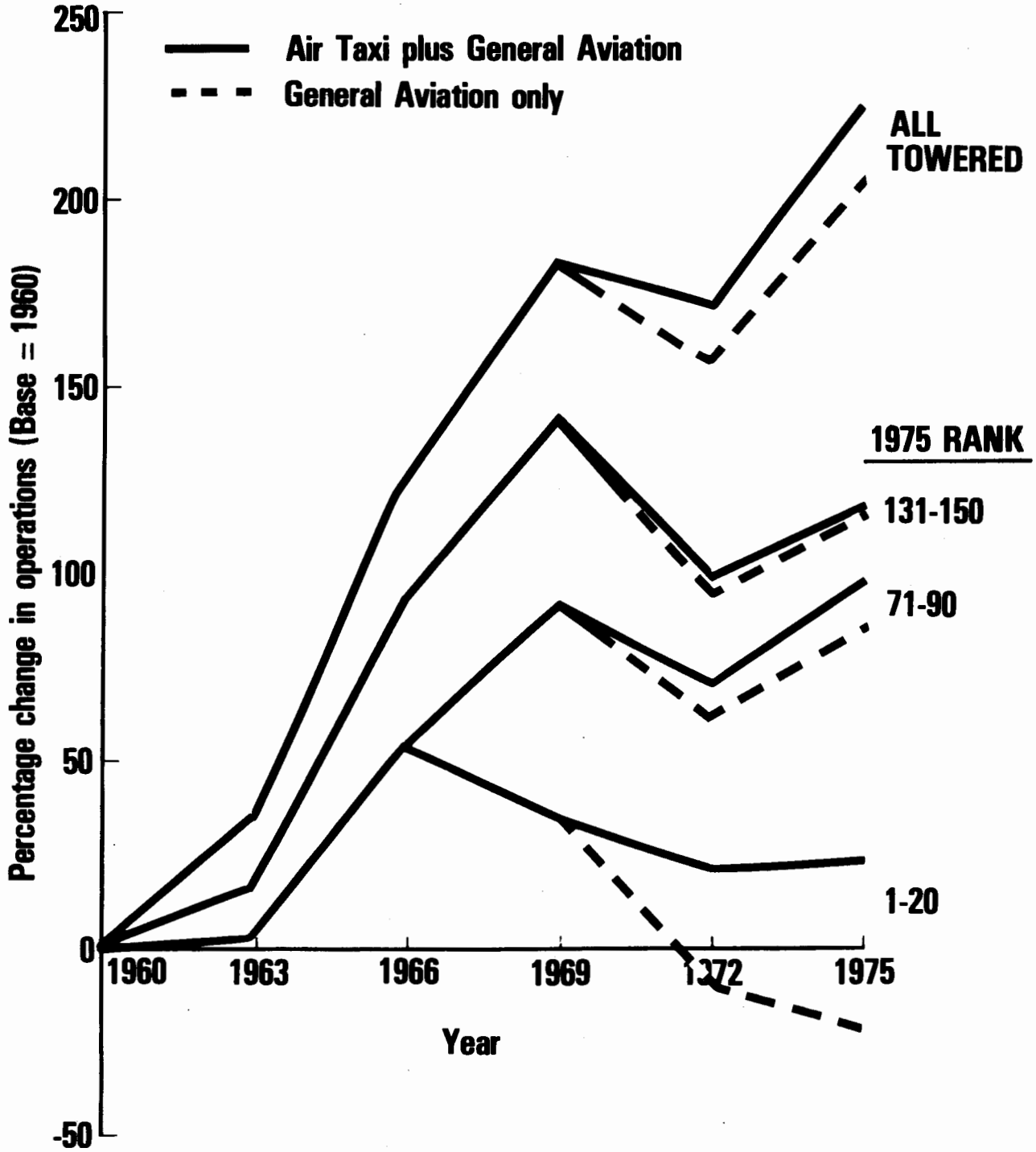
COMPARISONS BETWEEN SELECTED AIRPORT CATEGORIES

PARAMETER	ALL TOWERED AIRPORTS	AIRPORTS GROUPED BY 1975 AIR CARRIER OPERATIONS: AIRPORTS RANKED 1-20	AIRPORTS RANKED 71-90	AIRPORTS RANKED 131-150
TOTAL OPS CHANGE (1960-1975)	+ 133%	+ 41%	+ 50%	+ 70%
AIR CARRIER OPS CHANGE (1960-1975)	+ 29%	+ 64%	+ 6%	− 10.5%
G.A.* OPS CHANGE (1960-1975)	+ 224%	+ 23%	+ 98%	+ 119%
TOTAL LOCAL OPS CHANGE (1960-1975) (G.A. + MILITARY)	+ 182%	− 78%	+ 56%	+ 77%
G.A. LOCAL OPS CHANGE (1960-1975)	+ 247%	− 75%	+ 100%	+ 122%
1975 G.A. SHARE OF OPS	76%	18.5%	73.9%	80%
1975 AIR CARRIER SHARE OF OPS	15%	70%	13%	9.2%

* INCLUDES AIR TAXI

VU-GRAPH 6

PERCENT CHANGE IN GENERAL AVIATION OPERATIONS FOR SELECTED GROUPS OF AIRPORTS RANKED BY AIR CARRIER OPERATIONS



VU-GRAPH 7

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 20 PERCENT FUEL & OIL COST INCREASE	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	7,057,319	– 5.8
PERSONAL	10,130,618	8,872,580	–12.4
EXECUTIVE	3,804,451	3,570,187	– 6.2
BUSINESS	8,127,763	7,484,472	– 7.9
AIR TAXI	1,948,223	1,766,863	– 9.3
COMMUTER	1,460,836	1,460,484	N. C.
RENTAL	2,702,216	2,381,821	–11.9
INDUSTRIAL	1,354,060	1,231,523	– 9.0
AERIAL	1,841,404	1,739,924	– 5.5
TOTAL	38,861,609	35,565,173	– 8.5

VU-GRAPH 8

1977 G.A. "PERSONAL" USE FLYING HOURS BY TYPE OF AIRCRAFT

TYPE OF AIRCRAFT	FLYING HOURS, BASE CASE	FLYING HOURS WITH 20 PERCENT FUEL & OIL COST INCREASE	PERCENT CHANGE
SINGLE ENGINE PISTON (1-3 SEAT)	2,248,341	1,951,747	-13.2
SINGLE ENGINE PISTON (4-SEAT & OVER)	7,265,837	6,363,997	-12.4
TWIN ENGINE PISTON (UNDER 12,500 LBS)	548,487	495,039	-9.7
TWIN/MULTI-ENG.PISTON (OVER 12,500 LBS.)	5,501	5,161	-6.2
TWIN ENGINE (TURBO PROP)	9,231	8,684	-5.9
TWIN/MULTI-ENGINE (TURBOJET)	26,860	23,130	-13.9
ROTARY WING (PISTON & TURBINE)	26,361	24,822	-5.8
TOTAL	10,130,618	8,872,580	-12.4

VU-GRAPH 9

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 20 PERCENT FUEL/OIL PLUS 20 PERCENT MAINT. COST INCREASES	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	6,878,059	– 8.2
PERSONAL	10,130,618	8,371,109	–17.4
EXECUTIVE	3,804,451	3,407,436	–10.4
BUSINESS	8,127,763	7,154,233	–12.0
AIR TAXI	1,948,223	1,647,608	–15.4
COMMUTER	1,460,836	1,460,896	– N.C.
RENTAL	2,702,216	2,254,703	–16.6
INDUSTRIAL	1,354,060	1,169,474	–13.6
AERIAL	1,841,404	1,693,922	– 8.0
TOTAL	38,861,609	34,037,440	–12.4

VU-GRAPH 10

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 5 PERCENT DECREASE IN COSTS	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	7,678,676	+ 2.5
PERSONAL	10,130,618	10,637,167	+ 5.0
EXECUTIVE	3,804,451	3,929,808	+ 3.3
BUSINESS	8,127,763	8,406,143	+ 3.4
AIR TAXI	1,948,223	2,045,635	+ 5.0
COMMUTER	1,460,836	1,460,836	N.C.
RENTAL	2,702,216	2,837,328	+ 5.0
INDUSTRIAL	1,354,060	1,411,284	+ 4.2
AERIAL	1,841,404	1,885,884	+ 2.4
TOTAL	38,861,609	40,292,761	+ 3.7

Supplementary Data Prepared

For The Presentation Entitled

"THE CRITICAL REALITIES"

Given By F. A. Meister

at the

Aviation Review Conference

Washington, D.C.

May 24, 1976

TABLE OF CONTENTS

Page

List of Appendices and Tables. v

List of Figures. viii

1. Executive Summary 1

2. Introduction and Purpose 13

3. FAA Responsibility Under Law 17

A. Legal Requirements Cited by General Aviation Respondents 17

B. Some Additional Requirements of the Current FAA Act 18

C. Conclusions Regarding Promotion of Aviation Under the Current FAA Act 19

4. Trends in General Aviation 21

A. Introduction 21

B. National-Level GA Trends and Status. . . . 21

(1) U.S. Active General Aviation Fleet. . 22

(2) General Aviation Fleet by Type of Aircraft 22

(3) Hours Flown in General Aviation by Type of Aircraft. 23

(4) Hours Flown and Miles Flown in General Aviation by Type of Flying. 24

(5) General Aviation Aircraft by Type of Aircraft of Primary Use: January 1, 1975 26

(6) General Aviation Aircraft Production. 27

(7) Total Operations at Towered Airports. 27

(8) Itinerant and Local Operations at FAA Towered Airports. 29

(9) Instrument Operations at Towered Airports 29

C. GA at Varying Airport Levels. 30

(1) Airports Ranked 1-20 31
(2) Airports Ranked 71-90 32
(3) Airports Ranked 131-150. 33

5. Analysis of GA Trends at the Airport Level . . . 37

A. Specific Airports Within the 1-20 Rank. . . 37

(1) Operations Activity. 37

(2) Other Attributes Relating to GA Activity 39

(a) Los Angeles International, Los Angeles, California 39

(b) Dallas-Ft. Worth, Regional Airport, Dallas Love Field, Dallas, Texas. 40

(c) Miami International Airport, Miami, Florida. 40

B. Specific Airports Within the 71-90 Rank . . 41

(1) Operations Activity. 41

(2) Other Attributes Relating to GA Activity 43

(a) Greensboro/High Point Regional Airport, Greensboro, N.C. 43

(b) Orange County Airport, Santa Ana, California 43

(c) Wichita Mid-Continent, Wichita, Kansas. 44

(d) Byrd International, Richmond, Virginia. 44

C. Specific Airports Within the 131-150 Rank . 45

(1) Operations Activity 45

(2) Other Attributes Relating to GA Activity. 46

(a) New Hanover County, Wilmington, North Carolina 46

(b) Smith-Reynolds Airport, Winston-Salem, North Carolina. 47

D. Additional Analysis. 48

6. Additional Forces Impacting GA. 51

A. Introduction 51

B. Forces Already in Effect 51

(1) Facility Establishment Criteria 51

(2) Recent Regulatory Actions 53

(a) Revised Pilot Certification Requirements 53

(b) Terminal Control Areas (TCA) . . . 53

(c) Increased Separation Standards Between Small, Large and Heavy Aircraft 54

(d) Emergency Locator Transmitters . . 55

(e) Cockpit Voice Recorders/Flight Data Recorders 55

(f) Transponders 56

C. Developing Forces. 57

(1) Revised User Charges. 57

(2) New Federalism. 59

7. Potential Future Policy Considerations. 61

A. With the User Charge Structure Unchanged . . 62

B. With a Modification of the Current User Charge Structure 63

8. Conclusions and Additional Work Required. 65

A. General Aviation Elasticities. 65

B. General Aviation Service Requirements. . . . 66

LIST OF APPENDICES

Appendix A: National-Level Data Regarding General Aviation

Table 1: U.S. Active General Aviation Fleet. . . . 69

Table 2: General Aviation Active Aircraft by Type, 1961-1975 70

Table 3: Hours Flown in General Aviation by Type of Aircraft: 1960-1974. 71

Table 4: Estimated Hours Flown in General Aviation by Type of Flying, 1960-1974. 72

Table 5: Estimated Miles Flown in General Aviation by Type of Flying, 1960-1974 73

Table 6: Active General Aviation Aircraft by Type of Aircraft and Primary Use, 1/1/75 . . . 74

Table 7: U.S. General Aviation Unit Shipments by Type of Aircraft, 1960-1975 75

Table 8: U.S. General Aviation Fixed Wing Shipments, 1960-1974. 76

Table 9: Number of FAA Towered Airports and Operations at FAA Towered Airports, 1960-1975 77

Table 10: Itinerant Operations at FAA Towered Airports, 1960-1975 78

Table 11: Local Operations at FAA Towered Airports, 1960-1975 79

Table 12: Instrument Operations at FAA Towered Airports, 1968-1975 80

Appendix B: Specific Airport Data Regarding General Aviation

Table 13: Cumulative Percent Distribution of Air Carrier Operations by Rank of Airport, 1975. 83

Table 14: Growth in Operations at Towered Airports, Selected Years, 1960-1975 84

Table 15: Growth in Operations at Airports Ranked 1-20 in Air Carrier Operations in 1975, Selected Years, 1960-1975 85

Table 16: Growth in Operations at Airports Ranked 71-90 in Air Carrier Operations in 1975, Selected Years, 1960-1975 86

Table 17: Growth in Operations at Airports Ranked 131-150 in Air Carrier Operations in 1975, Selected Years, 1960-1975 87

Table 18A: Growth in Operations at Selected Airports, Category 1, Selected Years, 1960-1975 . . 88

Table 18B: Percent Distribution of Operations at Selected Airports, Category 1, Selected Years, 1960-1975 89

Table 19A: Growth in Operations at Selected Airports, Category 2, Selected Years, 1960-1975 . . 90

Table 19B: Percent Distribution of Operations at Selected Airports, Category 2, Selected Years, 1960-1975 91

Table 20A: Growth in Operations at Selected Airports, Category 3, Selected Years, 1960-1975 . . 92

Table 20B: Percent Distribution of Operations at Selected Airports, Category 3, Selected Years, 1960-1975 93

Table 21: Characteristics of Selected Airports 1974-1975 94

Appendix C: Rank Order of Airports Grouped by 1975 Air Carrier Operations

Table 22: Airports Ranked 1-20 in Air Carrier Operations 97

Table 23: Airports Ranked 71-90 in Air Carrier Operations 98

Table 24: Airports Ranked 131-150 in Air Carrier Operations 99

Appendix D: Impact of Changes in Costs (Fuel and Maintenance) on 1977 General Aviation Flying Hours

Table 25: 1977 GA Flying Hours by Category of Use (Base Case and with 20 Percent Fuel and Oil Cost Increase). 103

Table 26: 1977 GA "Personal" Use Flying Hours by Type of Aircraft (Base Case and with 20 Percent Fuel and Oil Cost Increase). . . 104

Table 27: 1977 GA Flying Hours by Category of Use (Base Case and with 20 Percent Fuel/Oil plus 20 percent Maintenance Cost Increases) 105

Table 28: 1977 GA Flying Hours by Category of Use (Base Case and with 5 Percent Decrease in Costs). 106

LIST OF FIGURES

Figure 4-1: Percent Change in General Aviation Operations for Selected Groups of Airports Ranked by Air Carrier Operations. 35

1. Executive Summary

This paper was undertaken as a follow-up to recent efforts by FAA to obtain total community involvement on the subject of general aviation and where it is headed.

In recent months various forums have been utilized by FAA in an attempt to stimulate constructive thinking and dialogue within the aviation community on the subject of the future of General Aviation (G.A.). For example, at the FAA's Aviation Review Conference in Washington, D.C. on May 19, 1975, the relationship of Federal and state responsibilities was explored by Fred Meister. In that presentation, Mr. Meister focused on the traditional role of FAA to promote aviation. He pointed out that the Administration's dedication to the tenets of "New Federalism" was also a consideration not necessarily in consonance with that traditional role. It was further noted that an additional consideration to the "promotion" question was the fact that system capacity gains are now realized only after incurring significant capital investment costs.

A few months later, at the October 29, 1975 meeting of the Air Traffic Control Association, Washington, D.C., Mr. Meister repeated the message that we all need to be thinking about the possible future growth of aviation. At this particular forum, however, statistics were presented which indicated a shift was occurring in general aviation operation activities away from the large air carrier airports. Therefore, it was contended that existing forces were already at work in causing this apparent shift or constraint. FAA spokesmen speculated at the resulting impact on general aviation of these existing forces in combination with future anticipated capacity demands.

General aviation representatives varied in their response to the FAA prodding. Some decried the existence of such forces but recognized the FAA objective as the development of the most effective and equitable policies in dealing with future aviation needs. Others incorrectly envisioned an emerging FAA campaign to arbitrarily apply constraints on general aviation in response to some concocted future need.

The preceding provides the background from which the purpose of this paper is drawn. That being, to seek answers to the questions already posed, to resolve misconceptions that apparently exist; and to identify additional work that must be done in order to properly address the future of G.A. This paper is addressed towards the illumination of these areas.

Accordingly, this paper expands first on the FAA purpose as being the identification of: current forces acting on G.A.; the elements within G.A. most effected by those forces; the extent of the effects; and future policies which may also have an impact.

Next, FAA responsibility under law is discussed at minor length to make the point that the FAA charge "to encourage and foster the development of civil aeronautics" may be viewed, in certain cases, as opposing the further charge "to ensure the safety of aircraft and the efficient utilization of...airspace." Thus, it would follow that the discussion of potential tradeoffs between these legislative forces is appropriate.

The major thrust of the paper lies in the development of an overview of general aviation activity at the national level followed by a treatment of G.A. activity at varying aggregations of air carrier airports. Accordingly, the past trends and present status of general aviation were first studied at the national level.

In order to obtain a clear picture of the general aviation segment of the industry over a long period, national level data were assembled for the 1960-1975 time frame, wherever possible. Historical data were gathered on such activity indicators as fleet distribution, hours and miles flown, production and FAA operations. Examination and comparison of these activity levels yield the following major findings:

- The general aviation fleet currently accounts for 98 percent of all active civil aircraft in the United States. In 1975, the general aviation fleet numbered 161,500 active aircraft.

- Historically, the growth in the general aviation fleet has been dramatic. Between 1940 and 1959, the G.A. fleet increased by an average of 7.5 percent per year, from 17,000 to 67,000 active aircraft.

- During the 1960's, the G.A. fleet saw the most rapid growth period, averaging 8 percent per year from 1965 to 1970 (89,000 to 131,000 aircraft).

- The rate of increase of the general aviation fleet has declined over the last five years. From 1970-1975, the fleet averaged 4.0 percent growth a year. This slowdown in the rate of increase reflects the general slowing of activity in the national economy.

- In 1960, there were about 68,000 single-engine piston aircraft in the G.A. fleet, representing almost 90 percent of the fleet; by 1975, there were 132,000 single-engine piston aircraft, about 82 percent of the fleet.

- Although single-engine piston aircraft constitute the major portion of the G.A. fleet, a trend has been evidenced towards more complicated aircraft reflecting increased sophistication and a higher level of training and certification among G.A. pilots.

- From 1960 to 1974, hours flown by general aviation aircraft have increased an average of 7 percent per year, from 12.2 million hours in 1960 to 32.5 million hours in 1974.

- Single-engine piston aircraft account for the largest percentage of hours flown, corresponding to the preponderance of this type of aircraft in the fleet. In 1974, single-engine pistons accounted for 71 percent of total hours flown.

- Turbines exhibit the highest utilization rate of all categories of G.A. aircraft, in keeping with the higher purchase and operating costs of this type of aircraft. In 1974, turbines flew an average of 568 hours per year, compared with 175 hours for single-engine pistons; 273 hours for multi-engine piston; 389 hours for rotorcraft; and 200 hours for other aircraft.

- Business flying has and continues to be the largest segment of G.A. flying in terms of hours and miles flown. In 1974, hours flown

by business aircraft accounted for 28 percent of total hours flown; miles flown by the business G.A. fleet accounted for 35 percent of total miles flown.

- In 1975, 49 percent of all G.A. aircraft were used primarily for personal and pleasure flying; 27 percent were used as business and executive transportation; 13 percent for instruction; 9 percent for commercial uses; and 2 percent for other uses.

- A high proportion of the turbine and multi-engine piston aircraft are used for business purposes; in 1975, 79 percent of the turbines and 61 percent of the multi-engine pistons. The major portion (56 percent) of single-engine pistons are used for personal and pleasure flying.

- In 1975, U.S. manufacturers of general aviation aircraft shipped a total of approximately 14,880 aircraft. Currently, single-engine piston aircraft account for 77 percent of total production; multi-engine aircraft for 17 percent; and rotorcraft for 6 percent of production.

- During the 1960's, total G.A. operations grew from 25.8 million (in 1960) to a peak of 56.2 million (in 1969). This represented an average annual increase of 9 percent.

- From 1970 to 1975, the rate of growth of total G.A. operations has slowed, averaging 1.5 percent a year from that period.

- General aviation operations constitute an increasing proportion of total operations. By 1975, general aviation accounted for about 76 percent of all operations at towered airports; air taxi, 5 percent; air carrier, 15 percent; and military, 4 percent.

- Itinerant operations at towered airports account for 63 percent of all operations. In 1975, G.A. itinerant operations accounted for 65 percent of all itinerant operations.

- In 1975, general aviation local operations constituted 94 percent of all local operations.

- From 1968 to 1975, total instrument operations at towered airports increased 70 percent, largely due to growth in G.A. and air taxi instrument operations.

- The growth in instrument operations reflects greater sophistication among general aviation aircraft and pilots and increasing use of avionics equipment.

To determine trends in general aviation at towered airports with differing degrees of air carrier activity, airports were ranked by number of air carrier operations and operations data were gathered on airports at varying aggregation levels. Some of the significant findings for airports at these levels follow.

At airports ranked 1-20 in air carrier operations:

- From 1960 to 1975, total operations at the 20 largest air carrier airports increased by 41 percent. Air carrier operations increased by 64 percent during this period and general aviation operations, including air taxi, increased 23 percent.

- In 1975, general aviation operations accounted for 18.5 percent of all operations at these 20 airports, compared with 75 percent of operations at all towered airports.

- In 1975, local operations accounted for more than 36 percent of all operations nationally. However, at the top 20 airports, local operations represented less than 2 percent of total operations.

At airports ranked 71-90 in air carrier operations:

- Total operations, at airports ranked 71 to 90 in air carrier operations, increased by 50 percent during the 1960-1975 period. General aviation operations, including air taxi, increased 98 percent, while air carrier operations increased by only 6 percent.

- In 1975, general aviation operations represented 73.9 percent of total operations at these airports and 75.5 percent nationally.

- Local operations represented 36 percent of operations at these airports and 37 percent of operations on a national level.

At airports ranked 131-150 in air carrier operations:

- Total operations at these airports increased 70 percent during the 1960 to 1975 period. General aviation operations, including air taxi, increased 119 percent while air carrier operations declined 10.5 percent.

- In 1975, general aviation operations represented 80 percent of total operations at these airports. Local operations accounted for 40.5 percent of total operations.

Differences were seen in the representation of G.A. activity at various airport levels ranked by air carrier activity. In an effort to gain greater insight to the reasons for these differences, selected airports within each level were further analyzed. In certain cases, specific airports were visited and authorities interviewed.

Specific attributes were first selected as potentially crucial to the analysis. These included: the G.A. operational activity at the representative airport; the existence of landing fees; FBO data; fuel availability; and the existence of TCA's.

At the aggregated airport levels, some of the factors seen to contribute to reduced levels of general aviation activity include the following:

- High costs or no available vacancies associated with tie-down facilities.

- Availability of services from Fixed-Base operations.

- High delay in terminal procedures incurred by G.A.

The data are suggestive but not offered as conclusive. Additional information and study are considered necessary before responsible detailed conclusions can be reached.

In an attempt to get further information on certain other attributes on which little data could be gathered or on which available data proved inconclusive, we

applied a general aviation model, developed for the Office of Aviation Policy, to confirm the assumption that fuel cost, for example, was closely related to general aviation activity. The model analysis work indicates that any increase in fixed or variable operating costs, whether it be for landing fees, maintenance, tie-down fees, training, et.al., are expected to drive down the general aviation flying hours below presently anticipated levels. Thus, although concrete evidence was not established for every attribute investigated at each of the sample airports, it is contended that the original hypothesis is basically correct, i.e., cost impacts or regulatory impacts which can be translated into cost impacts will inhibit G.A. growth. Conversely, any action(s) taken to reduce such costs will act to stimulate G.A. growth.

At the national level as well as the aggregated airport levels, there are additional existing forces already in effect as well as forces seen to be developing with potential impact on general aviation.

The forces currently existing include the following:

- Facility Establishment Criteria

  The concept of establishment criteria was first applied to terminal facilities and services with the implementation of Airway Planning Standard (APS) #1 in March 1951. The purpose of the APS series is to provide an orderly means of establishing air traffic control and navigation facilities in accordance with aeronautical need and FAA policy. As experience was gained in the application of these criteria, they were changed to better meet the requirements of the aviation users. In 1975, the FAA completed four analytical studies that developed revised establishment and discontinuance criteria for major airport operational aides (including ATCT, ASR, ILS and ASDE). The revised criteria bring about more cost-effective utilization but inadvertently result in more stringent criteria for general aviation airports.

  The primary impacts of the revised criteria are to lower establishment levels at air carrier airports and to raise them at general aviation airports.

- Recent Regulatory Actions

Increased sophistication and continued demand for safety in the National Aviation System impose ever-increasing rules and requirements upon general aviation. Recent regulatory actions impacting in varying degrees on general aviation are:

(1) Revised pilot certification requirements which in effect places more stringent requirements in training, testing, and certification in virtually all pilot categories.

(2) Terminal Control Areas (TCA) - Within Terminal Control Areas, all aircraft are subject to operating rules, and pilot and equipment requirements specified in Part 91 of the FAR's. Each TCA is designated as a Group I, Group II, or Group III Terminal Control Area according to traffic density; and they differ primarily in equipment requirements and operating rules.

(3) Increased separation standards between small, large, and heavy aircraft.

As a precautionary safety measure, new procedures require air traffic controllers to provide an extra mile of separation between large and small aircraft because of possible effects of wake turbulence.

(4) Emergency Locator Transmitters - After June 30, 1974, most general aviation aircraft were required to be equipped with an emergency locator transmitter (ELT) and must have the ELT armed during flight.

(5) Cockpit Voice Recorders/Flight Data Recorders -

FAA required that as of May 15, 1975, air taxi operators using business-type jets must equip these aircraft with cockpit voice recorders and flight data recorders which are to be operated continuously throughout the flight.

(6) Transponders - Effective July 1, 1975, ATC radar beacon transponders were required in all U.S. registered civil aircraft operating

in controlled airspace of the 48 contiguous states and the District of Columbia above 12,500 feet MSL, excluding the airspace at and below 2,500 feet AGL.

Among the specific impacts of these regulatory actions on general aviation are: increased equipage and other costs; and further delay in utilization of the system.

In addition to the existing forces stated above, there are potential major developing forces seen to influence general aviation activity. These include:

- Potential Revised User Charges

  The Airport and Airway Development Act of 1970 authorized a long-range program for expansion and improvement of the Nation's airports and airways. It was to be financed, in large part, by new levies on the users of the system.

  The Act levied user taxes on aviation fuels, domestic airline fares, departing international passengers, domestic air freight, aircraft tires and tubes, and aircraft registration. Revenues from these user taxes are paid into the Airport and Airway Trust Fund. The gap between the costs allocated to general aviation and the revenues received is large and growing. In 1971, general aviation tax receipts covered approximately 22 percent of the allocated costs, but the number was projected to fall to 18 percent by the end of 1975.

  The Administration is seeking a revised fuel tax and user charge program to recover from actual users more of the costs incurred by the Federal Government in providing airport and airway services.

  If the Administration's program becomes law, a more equitable state will have been achieved in allocating system costs among system users. However, since general aviation has, in the past, paid less than its equitable share, correction of the situation now or in the future will be reflected by lower general aviation growth rates than if that correction did not take place.

- New Federalism

The philosophy of New Federalism is the relinquishment of Federal control where state or local jurisdictional control is feasible. This philosophy should allow more appropriate decision making with regard to G.A. airport development. At the same time, however, the "promotion" of general aviation (at least at the airport level) would appear to be delegated to the state/local government by virtue of the "New Federalism" philosophy.

One major question remains. That being, "What are the policies FAA may consider in the future which could also impact general aviation?"

Accordingly, some of the potential future policy considerations FAA may investigate touch upon:

- The ability of the current system mechanisms (regulations, economics, et.al.) to adjust to increased system demands.

- The additional actions needed to supplement the current system such as:

  - peak hour restrictions
  - variable landing fees
  - restructured levels of service for G.A.
  - re-allocation of G.A. costs to users based on actual service desires and needs.

The paper concludes with the determination that certain existing forces have, in fact, been causing shifts in the nature of general aviation use. It is further stated that in light of these forces (together with potential future system needs) conscious policy development must be undertaken. But before analysis can go forward on the range of policy alternatives at FAA's disposal, additional information and data are required from the entire aviation community. Total involvement of all the elements of aviation is required if success is to be achieved. The general aviation community is urged to participate and to provide necessary inputs needed to make the policy development process effective. Inputs needed touch upon:

- General Aviation Elasticities:

  - tradeoffs between available services and G.A. activity
  - tradeoffs between airport activity and CBD proximity
  - tradeoffs between system costs and use

- o General Aviation Service Requirements:
  - potential modification of existing nonsafety related services
  - potential development of new G.A. services

The general aviation community is called upon to assist in the development of these information needs.

2. Introduction and Purpose

In recent months various forums have been utilized by FAA in an attempt to stimulate constructive thinking and dialogue within the aviation community on the subject of the future of General Aviation (G.A.). Many aspects of aviation have been discussed at these forums. For example, at the FAA's Aviation Review Conference in Washington, D.C., on May 19, 1975, the relationship of Federal and state responsibilities was explored by Fred Meister[1/] in his presentation on "major new FAA policy directions." In the context of that presentation, Mr. Meister focused on the traditional role of FAA to promote aviation. He pointed out that the Administration's dedication to the tenets of "New Federalism"[2/] was also a consideration not necessarily in consonance with that traditional role. It was further noted that an additional consideration to the "promotion" question was the fact that system capacity gains are now realized only after incurring significant capital investment costs. This latter concern is heightened by the DOT/FAA view that all the users of the system are not fully paying for services received now. Specifically, DOT/FAA have determined in the Airport and Airway Cost Allocation Study that G.A. should be footing 30 percent of the total bill and are in fact paying only 20 percent of that apportioned share, or only 6 percent of total system costs.

In consideration of the above background, Mr. Meister asked the following questions:

(1) What is the continued proper Federal role in aviation development?

(2) Should the Federal Government continue an active policy of promotion of aviation, especially general aviation?

and (3) Should more effective policies be adopted which would shift demand of airlines to off-peak hours and general aviation away from major hub airports?

A few months after the Aviation Review Conference presentation, Fred Meister repeated the message that we <u>all</u> need to be thinking about the possible future growth of aviation. The forum for this particular presentation

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1/ FAA Associate Administrator for Policy Development and Review (Acting).

2/ Generally defined as the replacement of the Federal presence by state or local jurisdictions in certain governmental areas.

was the October 29, 1975, meeting of the Air Traffic Control Association, Washington, D.C.3/ Something new was added this time, however, as statistics were presented showing some rather odd behavioral patterns for general aviation at the 25 largest air carrier airports. At these airports, G.A. accounted for only 24 percent of all operations, while G.A. represented 75 percent of total operations at all FAA towered airports. In effect, forces were already being exerted which caused G.A. activity at the larger airports to differ substantially from the nationwide average activity patterns. Thus, as we now view the situation, the questions become more complicated.

. What are the current forces acting upon general aviation?

. What specific elements within G.A. are most affected?

  - pleasure flying? training? corporate use?

. What is the extent of the effects of the current forces on these elements?

. What are the policies FAA may consider in the future which could also impact general aviation?

After the May presentation, but more evident after the October speech by Mr. Meister, FAA started to receive some of the response it had sought. Unfortunately, some of this was accomplished in a reactive, defensive manner by certain of the general aviation respondents. From one source,4/ for example, came the following:

. "While you (Mr. Meister) carefully did not advocate such constraints, you nevertheless treated the subject in such a manner as to leave no doubt in the minds of your listeners that, in fact, you were advocating... constraints..."5/

3/ Speech entitled, "Policy/Legislative Factors Influencing Aviation - Next 20 Years."

4/ AOPA open letter to Fred Meister, February 17, 1976.

5/ Response: While it is difficult to argue with such subjective remarks, we feel it must be done. Fred Meister did not explicitly or implicitly advocate constraints. What was suggested, however, was the possibility that unbridled demand might one day exceed FAA's ability to meet that demand in a cost-effective, safe manner. Accordingly, a shift in, or constraint on that demand might be one viable solution.

- "One of the constraints that is becoming more troublesome as time goes on is the philosophy of FAA that the users must serve the ATC system rather than the system serving the users."6/

- "In your October 29, 1975, speech you (Mr. Meister) cited traffic figures comparing 1955 with 1973 for some strange and unknown reason."7/

- "...the Administrator is directed by the Congress (Section 305 of the Federal Aviation Act of 1958) 'to encourage and foster the development of civil aeronautics and air commerce in the United States and abroad.'"8/

Some of the comments received provided constructive criticism while agreeing with the FAA observations. From one such source,9/ for example, came the following:

> "Mr. Meister said recently that Government constraints on general aviation have a significant effect on its growth. We here at EAA headquarters have recognized this for many years. He further states - and we certainly agree with him - that general aviation is being pushed out of major airports by rising costs of operation and maintenance, and in addition, the air traffic control system has constrained the nature of the demand by causing a shift of

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6/ Response: This has never been a philosphy of FAA. What is an FAA position, however, is that the users should equitably pay for the system service they receive.

7/ Response: Data was presented from 1955 but also included data for the years 1960, 1965, 1970 and 1973 to illustrate long-term trends. Data later than 1973 was consciously excluded to avoid confusing the issues with statistics warped by the energy embargo.

8/ Response: The Administrator is charged with other concerns as well, e.g., the safety of aircraft and the efficient utilization of airspace. The "promotion" aspects do not necessarily complement these other concerns at all times. See Chapter 3 for further comments.

9/ Comments by Paul Poberezny, President of the Experimental Aircraft Association (EAA) in the February 1976 issue of "Sport Aviation."

> personal use aircraft from the major air carrier and general aviation airports, to the less costly and less restricted rural airports. He further states that one can only wonder how long this source or any source of relief can be maintained."

This commenter continued from this point to express his organization's strong objections to the process that is causing this to happen, but as can be seen, he does not claim that the problem does not exist or that the FAA observations are wrong.

The preceding provides the background from which the purpose of this paper is drawn. That being, to seek answers to the questions already posed, to resolve misconceptions that apparently exist; and to identify additional work that must be done in order to properly address the future of G.A. This paper is addressed towards the illumination of these areas.

3. FAA Responsibility Under Law

A. Legal Requirements Cited by General Aviation Respondents

As was pointed out in the preceding chapter, a certain respondent10/ has commented to the effect that it is FAA's responsibility, "to encourage and foster the development of civil aeronautics and air commerce in the United States and abroad." Section 305 of the Federal Aviation Act of 1958 is properly credited as the source of this responsibility under law. Additionally, section 306 of that law is also cited as a legislative requirement which should be guiding FAA's activities. That section reads as follows:

> "In exercising the authority granted in, and discharging the duties imposed by, this Act, the Administrator (changed to Secretary of Transportation by DOT Act of 1966) shall give full consideration to the requirements of national defense, and of commercial and general aviation, and to the public right of freedom of transit through the navigable airspace."

The commenter interprets the above legislative requirements as being in direct opposition to FAA's even considering whether or not, "...the Federal Government should continue an active policy of promotion of aviation, especially general aviation."

On this assertion, the response is clear. The FAA is committed to a constant reevaluation of its current rules and regulations to ensure their continued propriety and usefulness.11/ Certainly, legislative requirements upon FAA should be, and are, also treated similarly. When, and if, such legislation is deemed no longer appropriate the agency will seek revision or rescission of such legislation through the appropriate mechanism(s). Such has been the case in the past, e.g., FAA attempts to secure changes in trust fund application;

10/ Ibid footnote 4/.

11/ Statement by then Acting Administrator James Dow before AOCI, October 21, 1975, Puerto Rico.

and FAA recommendations regarding revised and renewed Airport Development Aid Program legislation specifics. There is no reason why this philosophy should not continue. Therefore, merely because the subject of any discussion involves an area where current law exists - debate over continued desirability of such a law should not necessarily be treated as heresy.

That point aside, let us look at an enlarged picture of FAA's responsibility under the current law.

B. Some Additional Requirements of the Current FAA Act

As has already been discussed, FAA is "enpowered and directed to encourage and foster the development of civil aeronautics...," of which general aviation is certainly an important part. However, the same act which mandates this requirement also provides that:

> "The Administrator is authorized and directed to develop plans for and formulate policy with respect to the use of the navigable airspace; and assign by rule, regulation, or order the use of the navigable airspace under such terms, conditions, and limitations as he may deem necessary in order to insure the safety of aircraft and the efficient utilization of such airspace. He may modify or revoke such assignment when required in the public interest."12/

Additionally, the Act provides that:

> "The Administrator is further authorized and directed to prescribe air traffic rules and regulations governing the flight of aircraft, for the navigation, protection, and identification of aircraft for the protection of persons and property on the ground, and for the efficient utilization of the navigable airspace including rules as to safe altitudes of flight and rules for the prevention of collision between aircraft, between aircraft and land or water vehicles, and between aircraft and airborne objects."13/

12/ Section 307(a) of the Federal Aviation Act of 1958.

13/ Section 307(c) of the Federal Aviation Act of 1958.

Additionally, the Act provides that:

> "The Administrator shall submit to the President and to the Congress an annual report. Such report shall contain, in addition to a report of the work performed under this Act, such information and data collected by the Administrator as may be considered of value in the determination of questions connected with the development and regulation of civil aeronautics, the utilization of the airspace, and the improvement of the air navigation and traffic control system, together with such recommendations as to additional legislation related thereto as the Administrator may deem necessary, and the Administrator may also transmit recommendations as to legislation at any other time."14/ (emphasis added)

C. Conclusions Regarding Promotion of Aviation Under the Current FAA Act

In view of the additional mandates of the current FAA Act, discussed in section B above, it would appear that, for the sake of argument, an operational requirement, such as a TCA, can be applied in the terminal airspace if deemed "necessary in order to insure the safety of aircraft and the efficient utilization (emphasis added) of such airspace." This action is consistent with the current legislative requirements upon FAA. However, when viewed from the vantage point of "promotion of aviation" alone, such an action may represent an inhibition to the growth of certain elements of aviation unequipped to operate in a TCA. Thus, there is built into the current Act sufficient flexibility to require "promotion," as well as the safe regulation of the airspace even though both those requirements may be at odds with each other at certain times.

14/ Section 313(e) of the Federal Aviation Act of 1958.

4. Trends in General Aviation

A. Introduction

Chapters 2 and 3 of this paper have expanded upon past statements by FAA and have responded to specific reactions by general aviation industry representatives. Accordingly, those chapters have "plowed no new ground" on the very serious subject of general aviation. What has been reconfirmed, however, is something that all sides agreed to in the first place. Namely, that general aviation has special concerns. Beyond that, the causes and solutions to those concerns remain hotly disputed.

This chapter will attempt to shed additional light on those special concerns by, first, describing the past trends and present status of the various key aspects of general aviation on a national level. This data will be presented in the context of the total aviation environment, i.e., along with data concerning air carrier, military, et.al.

Secondly, comparisions will be made with specific levels of general aviation aggregation to discern anomalies that may exist at those levels. For example, what is occurring to general aviation at large air carrier airports that differs from the national tableau.

Later chapters will provide discussion of the apparent causes of these G.A. idiosyncrasies.

B. National-Level G.A. Trends and Status

In order to obtain a clear picture of the general aviation segment of the industry, over a long period, national level data was assembled for the 1960-1975 timeframe (wherever possible). This data is presented in tabular form in Appendix A and includes information on aspects of:

- fleet distribution by type and use
- aircraft hours and miles flown by type and use
- aircraft production
- operations - total, itinerant, local
- instrument operations

Some of the significant findings from these national level data follow:

(1) U.S. ACTIVE GENERAL AVIATION FLEET (See Table 1)

- General aviation aircraft account for approximately 98 percent of all active civil aircraft in the United States.

- In 1975, there were 161,500 active general aviation aircraft in the fleet, as compared to 2,600 air carrier aircraft.

- Historically, the growth in the general aviation fleet has been dramatic. Between 1940 and 1959, the G.A. fleet increased by an average of 7.5 percent per year, from 17,300 to 67,800 active aircraft.

- The G.A. fleet almost doubled during the next ten years, from 68,700 in 1960 to 124,200 in 1970. It was also during the 1960's that the G.A. fleet saw the most rapid growth period, averaging 8 percent per year from 1965 to 1970 (89,000 to 131,000 aircraft).

- The 8 percent growth rate during the 1965-1970 period is in contrast to the average yearly growth rate of 5.5 percent sustained during the last 15 years (1960 to 1975).

- The rate of increase of the general aviation fleet has declined over the last five years. From 1970-1975, the fleet averaged 4.0 percent growth a year. This slowdown in the rate of increase reflects the effect of a general slowing of activity in the national economy.

(2) GENERAL AVIATION FLEET BY TYPE OF AIRCRAFT (See Table 2)

- The types of aircraft used in general aviation activities cover a wide spectrum, from corporate multi-engine jet aircraft piloted by professional crews to amateur-built, single-engine piston acrobatic planes, balloons and dirigibles.

- Although the single-engine piston aircraft has always constituted the major portion of the G.A. fleet, its overall proportion has been declining as more sophisticated aircraft are added to the fleet. In 1960, there were 68,000 single-engine pistons, representing almost 90 percent of the fleet; by 1975, there were 132,000 single-engine piston aircraft, about 82 percent of the fleet.

- In 1975, larger, costlier and more complicated aircraft represented almost 20 percent of the total G.A. fleet.

  - Multi-engine piston: 12.3 percent, 19,800 aircraft
  - Turbines: 2.3 percent, 3,700 aircraft
  - Rotorcraft: 2.2 percent, 3,600 aircraft
  - All other: 1.5 percent, 2,500 aircraft

- The trend toward more complex aircraft also represents an increased sophistication and higher level of training and certification among G.A. pilots.

- Between 1970 and 1975, the number of turbine-powered aircraft increased at a rate of 11 percent per year as compared to the annual rate of 4 percent for all G.A. aircraft.

(3) HOURS FLOWN IN GENERAL AVIATION BY TYPE OF AIRCRAFT (See Table 3)

- Fleet size and hours flown are measures of general aviation activity.

- From 1960 to 1974, hours flown by general aviation aircraft have increased an average of 7 percent a year, increasing from 12.2 million hours in 1960 to 32.5 million hours in 1974.

- The period of most rapid growth occurred between 1964-1969, when the number of hours flown increased by 61 percent, an average annual growth of 10 percent.

- Single-engine piston aircraft account for the largest percentage of total hours flown,

corresponding to the preponderance of this type of aircraft in the fleet. In 1960, single-engine piston aircraft accounted for 80 percent of total hours flown. By January 1, 1975, the proportion had declined to 71 percent of total hours.

. As of January 1, 1975, the hours flown by all categories of G.A. aircraft, and their proportion of total hours flown are as follows:

- Single-engine piston: 23.1 million hours, 71 percent
- Multi-engine piston: 5.4 million hours, 17 percent
- Turbines: 2.1 million hours, 7 percent
- Rotorcraft: 1.4 million hours, 4 percent
- Other Aircraft: 0.5 million hours, 1 percent

. In recent years, hours flown by turbine-powered aircraft have shown the largest growth, increasing 16 percent annually between 1969-1974. The number of hours flown by turbines more than doubled during this five-year period, increasing from 1.0 million hours to 2.1 million hours.

. Utilization rate, defined as the average number of hours flown per aircraft per year, varies for different types of aircraft. Turbine-powered aircraft exhibit the highest utilization rate of all categories of G.A. aircraft, in keeping with the higher purchase and operating costs of this type of aircraft. In 1974, turbines flew an average of 568 hours per year, compared with 175 hours for single-engine pistons; 273 hours for multi-engine piston; 389 hours for rotorcraft; and 200 hours for other aircraft.

(4) <u>HOURS FLOWN AND MILES FLOWN IN GENERAL AVIATION BY TYPE OF FLYING</u> (See Tables 4 and 5)

. The primary uses of general aviation aircraft fall into five major categories:

- Business and executive transportation.
- Commercial usage, including air taxi, aerial application, and industrial and special uses.

- Instructional flying, including training and rental.
- Personal and pleasure flying.
- All other uses.

. G.A. total miles and total hours flown more than doubled from 1960 to 1974. Total miles increased from 1,769 million to 4,043 million and total hours increased from 13 million to over 32 million.

. Business flying has, and continues to be, the largest segment of G.A. flying, increasing from 5.7 million hours to 9.1 million hours in the 1960 to 1974 period, an average annual growth of 3.5 percent. Similarly, during the same period miles flown by business-use general aviation aircraft increased from 881 million miles to 1,433 million miles, also averaging 3.5 percent a year.

. While other categories of use have not reached the levels of business flying in terms of absolute numbers, the other categories have been growing at a faster rate then business flying and hence their proportional share of total hours and miles flown has increased since 1960 (See Tables 4 and 5).

. As of January 1, 1975, the number of hours flown and the proportional share of total hours flown for each category of use are as follows:

- Business Use: 9.1 million hours, 28 percent of hours flown.

- Commercial Use: 6.3 million hours, 19 percent of hours flown.

- Instructional Use: 8.0 million hours, 25 percent of hours flown.

- Personal Use: 8.4 million hours, 26 percent of hours flown.

- Other Use: 0.7 million hours, 2 percent of hours flown.

. As of January 1, 1975, the number of miles flown and the proportional share of total miles flown for each category of use are as follows:

- Business Use: 1,433 million miles, 35 percent of miles flown.

- Commercial Use: 790 million miles, 20 percent of miles flown.

- Instructional Use: 815 million miles, 20 percent of miles flown.

- Personal Use: 920 million miles, 23 percent of miles flown.

- Other Use: 85 million miles, 2 percent of miles flown.

(5) GENERAL AVIATION AIRCRAFT BY TYPE OF AIRCRAFT AND PRIMARY USE: JANUARY 1, 1975 (See Table 6)

. The general aviation fleet is not evenly distributed over the five categories of use. In 1975, 49 percent of all G.A. aircraft were used primarily for personal and pleasure flying; 27 percent were used as business and executive transportation; 13 percent for instruction; 9 percent for commercial uses; and 2 percent for other uses.

. A high proportion of the turbine and multi-engine piston aircraft are used for business purposes; in 1975, 79 percent of the turbines and 61 percent of the multi-engine pistons.

. The major portion of single-engine piston aircraft and "other" aircraft (gliders, balloons, dirigibles) are used for personal and pleasure flying; 56 percent of the single-engine pistons and 65 percent of "other" aircraft.

. The bulk of the helicopter fleet is used for commercial purposes (56 percent).

(6) GENERAL AVIATION AIRCRAFT PRODUCTION (See Tables 7 and 8)

- In 1975, U.S. manufacturers of general aviation aircraft shipped a total of approximately 14,880 aircraft, 50 more than the previous year. (These figures represent total U.S. general aviation aircraft production. In 1974, about 30 percent of production was exported to foreign markets. Since 1960, the proportion of exports to total shipments has fluctuated between 18 and 30 percent.)

- Between 1960 and 1975, general aviation shipments averaged 11,200 units annually. The average unit cost of fixed-wing shipments during this period ranged from $22,000 in 1961 to more than $63,000 in 1974. The total dollar value of these units ranged from $151.0 million in 1961 to $884.0 million in 1974.

- The general aviation aircraft industry is characterized by a high degree of volatility, due in part to its sensitivity to general economic conditions and to prospective purchaser's anticipation of future economic and price trends. For example, in 1960, the manufacturers shipped approximately 7,900 aircraft. The number of units increased to a peak of 16,000 units in 1966. From this peak, production declined almost every year back to the 1960 level of 7,900 in 1970 and 1971 (a period of national economic decline). Since that time, the total number of units produced has been increasing.

- Currently, single-engine piston aircraft account for 77 percent of total production; multi-engine aircraft for 17 percent; and rotorcraft for 6 percent of production.

(7) TOTAL OPERATIONS AT TOWERED AIRPORTS (See Table 9)

- An important measure of usage of the National Aviation System is the total number of operations at towered airports.

- During the 1960's, total operations grew from 25.8 million operations in 1960 to a peak of 56.2 million operations in 1969, an average annual increase of 9 percent.

- From 1970 to 1975, the rate of growth of total operations has slowed considerably, averaging 1.5 percent a year during that period. (Total operations decreased to 53.2 million in 1972 but increased to a total of almost 60.0 million operations in 1975.) This slowdown in growth is attributable to the impact of the general economy on aviation.

- Part of the increase in total operations is due to real growth and part may be attributed to the addition of control towers. Between 1970 and 1975, 85 new control towers were added, bringing the total of FAA control towers to 420 in 1975. Thus, each year, the number of operations at towered airports includes a certain amount of flying previously carried out at nontowered airports.

- The increase in the total number of operations in the 1970's is due to growth in general aviation operations (including air taxi), since both military and air carrier operations declined. From 1970 to 1975, air carrier operations decreased 11 percent, from 10.4 million in 1970 to 9.2 million in 1975. Similarly, military operations decreased 23 percent, from 3.5 million to 2.7 million operations. During the same period, general aviation and air taxi operations increased by 16 percent, from 41.4 million to 48.0 million.

- General aviation operations constitute an increasing proportion of total operations. By 1975, general aviation accounted for about 76 percent of all operations at towered airports; air taxi, 5 percent; air carrier, 15 percent; and military, 4 percent.

(8) ITINERANT AND LOCAL OPERATIONS AT FAA TOWERED AIRPORTS (See Tables 10 and 11)

- Itinerant operations at towered airports account for about 63 percent of all operations.

- From 1960-1969, itinerant operations grew from 18.0 million operations to 34.9 million, an average annual increase of 7.5 percent. From 1970 to 1975, itinerant operations increased 2 percent annually, to a total of 38.0 million in 1975.

- The increase in itinerant operations in the 1970-75 period is due to growth in general aviation and air taxi operations, since air carrier and military itinerant operations decreased during that period, an 11 percent and 16 percent decrease, respectively. During 1970-1975, the combined total of general aviation and air taxi itinerant operations increased 23 percent.

- In 1975, general aviation itinerant operations accounted for 65 percent of all itinerant operations; air taxi, 7 percent; air carrier, 24 percent; and military, 3 percent.

- Local operations at towered airports account for about 37 percent of all operations.

- Total local operations increased from 7.8 million in 1960 to a peak of 21.3 million in 1968, averaging 13.5 percent growth a year. Since that time, local operations have remained relatively constant and totaled 21.9 million in 1975.

- Historically, local operations are almost all general aviation operations. In 1975, general aviation constituted 94 percent of all local operations. The remaining 6 percent were military operations.

(9) INSTRUMENT OPERATIONS AT TOWERED AIRPORTS (See Table 12)

- From 1968 to 1975, total instrument operations at towered airports increased 70 percent

(15.7 million to 26.8 million). This increase is largely due to growth in general aviation and air taxi instrument operations, which grew over 22 percent annually during that period. Air carrier and military instrument operations showed only small increases in this time period.

- The growth trend in instrument operations reflects greater sophistication among general aviation pilots and aircraft and the increasing use of avionics equipment. By 1975, general aviation instrument operations accounted for 43 percent of all instrument operations, totaling 11.6 million operations. In the same year, air carrier represented 35 percent; military 14 percent; and air taxi 7 percent of instrument operations.

- The increase in instrument operations is due in part to growth in the number of larger, more sophisticated aircraft in the G.A. fleet and in part to FAA regulations. These regulations make the use of certain types of avionics equipment mandatory when flying in certain controlled areas.

C. G.A. at Varying Airport Levels

Section B, above, provided an overview of the general aviation industry and the relative position of that segment of aviation within the total aviation community. This was accomplished on a national level and, wherever possible, over the years from 1960 to 1975.

A primary purpose of this paper is to determine trends in general aviation at airports with varying degrees of air carrier activity. Accordingly, towered airports were ranked by number of air carrier operations and operations data were gathered on the following airports as distinct groups:15/

- Airports ranked 1-20 in air carrier operations in 1975

- ditto for airports ranked 71-90

- ditto for airports ranked 131-150

15/ These groups were arbitrarily selected in an attempt to discern differences in G.A. activities between groups.

This section, therefore, provides data concerning general aviation activities as they relate to lower levels of aggregation. These data are then compared to the national averages and, where significant differences are observed, they are highlighted. Highlights of national averages, extracted from data in Section B, and information on lower levels of aggregation are presented in tabular form in Appendix B.

The names of the individual airports in rankings 1-20, 71-90, and 131-150 are shown in Appendix C.

Table 13 indicates that in 1975, the 20 airports with the largest amount of air carrier activity account for over 48 percent of all air carrier operations that year; airports ranked 71 to 90 account for 5 percent of air carrier activity; and airports ranked 131 to 150 account for only 2.4 percent of air carrier activity. The top 150 airports together account for almost all air carrier operations (93 percent).

It should be noted that prior to 1972, air taxi operations were included in general aviation operations. The inability to separate general aviation and air taxi operations prior to 1972 makes comparisons of general aviation activity over the entire 1960 to 1975 period somewhat difficult.

(1) Airports Ranked 1-20 (See Tables 14 and 15)

- From 1960 to 1975, total operations at the 20 largest air carrier airports increased by 41 percent. Air carrier operations increased by 64 percent during this period and general aviation operations, including air taxi, increased 23 percent.

- Although general aviation operations, including air taxi, increased by only 1 percent during the 1972-1975 period, air taxi operations alone grew 38 percent. During the same period, general aviation alone declined 12 percent, and air carrier declined 7 percent.

- Local operations decreased by 78 percent over the last 15 years, from 486,000 to 106,000. General aviation local operations declined 75 percent and account for less than 2 percent of total operations at these major airports, compared with 36 percent nationally.

- In 1975, general aviation operations accounted for 18.5 percent of all operations at these 20 airports, compared with 75 percent of operations at all towered airports. Conversely, air carrier operations represented 70 percent of total operations, as compared with 15 percent nationally.

- Air taxi and commuter airlines represent an increasing share of operational activity at these airports. Air taxi operations grew from 7 percent of operations in 1972 to over 10 percent in 1975, as compared with 4 and 5 percent, respectively, on a national level.

- In contrast to what is occurring on the national level, the proportion of general aviation operations to total operations at these airports has declined since 1960; general aviation, including air taxi, represented 33 percent of operations 15 years ago and currently represents 29 percent. Nationally, G.A. and air taxi's proportion of total operations has increased from 58 percent to 80 percent during the same period. In contrast, the percentage of air carrier operations has increased from 60 percent to 70 percent at these airports and declined on a national level from 28 percent to 15 percent.

(2) <u>Airports Ranked 71-90</u> (See Tables 14 and 16)

- Total operations, at airports ranked 71 to 90 in air carrier operations, increased by 50 percent during the 1960-1975 period. General aviation operations, including air taxi, increased 98 percent, while air carrier operations increased by only 6 percent.

- From 1972 to 1975, the number of air taxi operations grew over 47 percent. General aviation alone, excluding air taxi, increased 15 percent during the same period, and air carrier operations declined 10 percent.

- Total local operations (general aviation and military) increased by 56 percent during the 1960 to 1975 period at these airports. General aviation local operations increased 100 percent.

- In 1975, general aviation operations represented 73.9 percent of total operations. This is approximately the same proportion as the proportion of general aviation at towered airports on a national level (75.5 percent). Similarly, air carrier operations accounted for 13 percent of all operations at these airports and 15 percent of all operations nationally. Air taxi operations accounted for 5 percent of all operations nationally and at these airports.

- Local operations represented 36 percent of operations at these airports and 37 percent of operations on a national level.

- As on the national level, from 1960 to 1975, general aviation operations (including air taxi) show an increasing proportion of total operations, from 60 percent in 1960 to 79 percent in 1975. Nationally, the proportion of G.A. operations at all towered airports increased from 58 percent to over 80 percent in 1975. On the other hand, although the absolute number of operations has increased, the proportion of air carrier operations has decreased from 1960 to 1975. At airports ranked 71 to 90, air carrier operations represented 19 percent of operations in 1960 and 13 percent in 1975. Nationally, air carrier operations represented 28 percent of operations in 1960 and 15 percent in 1975.

(3) <u>Airports Ranked 131-150</u> (See Tables 14 and 17)

- Similar trends in operational activity can be seen for airports ranked 131 to 150 by air carrier operations.

  From 1960 to 1975:

  - Total operations increased 70 percent.

- General aviation, including air taxi, increased 119 percent.

- Air carrier operations declined 10.5 percent.

From 1972 to 1975:

- Air taxi operations declined 6.4 percent.

- General aviation, excluding air taxi, increased 9.6 percent.

- Air carrier operations decreased 5.8 percent.

In 1975:

- General aviation operations represented 80 percent of total operations, compared with 75 percent nationally.

- Air carrier operations represented 9.2 percent of total operations, compared with 15 percent nationally.

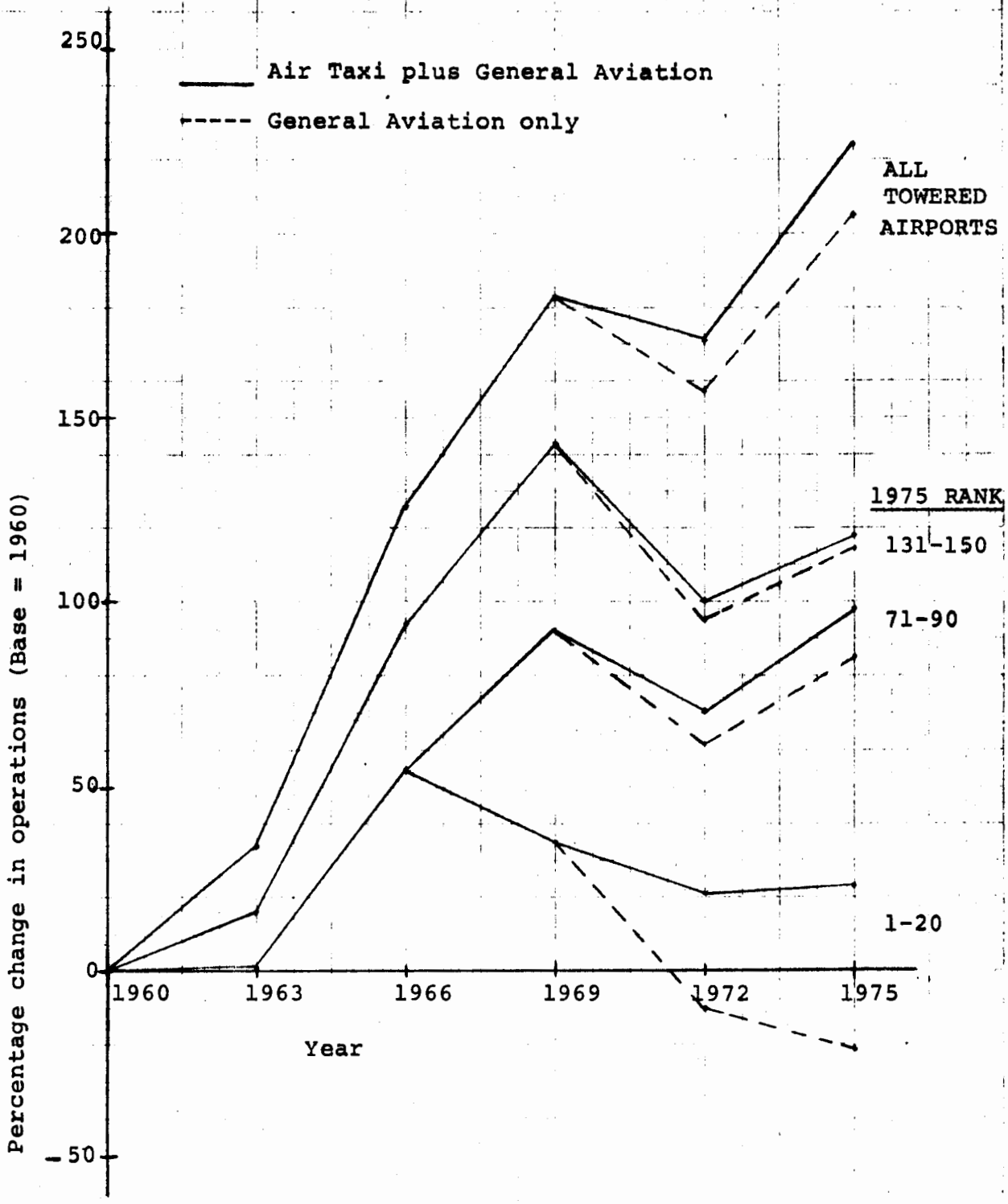
- Air taxi operations represented 2 percent of total operations, compared with 5 percent nationally.

- Local operations accounted for 40.5 percent of total operations, compared with 37 percent nationally.

Figure 4-1, on the next page, graphically depicts the differences in the percentage change in general aviation operations between 1960-1975 at all towered airports, and at airports ranked 1-20, 71-90 and 131-150 in 1975 air carrier operations. It should be noted that the growth curve for general aviation operations at all towered airports is biased due to an ever increasing number of towered airports between 1960-1975.

FIGURE 4-1

PERCENT CHANGE IN GENERAL AVIATION OPERATIONS
FOR SELECTED GROUPS OF AIRPORTS
RANKED BY AIR CARRIER OPERATIONS



5. Analysis of G.A. Trends at the Airport Level

The previous chapter discussed national trends in general aviation activity as well as trends at specific regimes of airports (airports ranked 1-20, 71-90 and 131-150 in 1975 air carrier operations). Differences were seen in the representation of G.A. activity at these various airport regimes. In an effort to gain greater insight to the reasons for these differences, selected airports within each regime are further analyzed in this chapter.

Specific attributes were first selected as potentially crucial to the analysis. These included: the G.A. operational activity at the representative airport; the existence of landing fees; FBO data; fuel availability; and the existence of TCA's. In as much as possible, this information is presented for each airport as a minimum.

In certain cases, specific airports were visited and authorities interviewed for the findings represented herein. The data are suggestive but not offered as conclusive. Additional information and study are considered necessary before responsible detailed conclusions can be reached.

Information is presented relating to operations activity and other attributes that may impact general aviation at specific airports within each of the selected groups. Data are provided on three airports in the 1-20 rank group; four in the 71-90 rank group; and two in the 131-150 rank group. Of these nine airports, three are located in the state of North Carolina; one from the 71-90 group rank and two in the 131-150 group rank. The selection of three airports in the same state was dictated by time and budget constraints.

A. Specific Airports Within the 1-20 Rank

(1) Operations Activity (See Tables 18A and 18B)

- Table 18A shows operations at Los Angeles International, Miami International and Dallas Love Field/Dallas-Ft. Worth Regional airports. In 1975, these airports were among the top 20 airports in air carrier operations activity: Los Angeles International ranked third; Dallas-Ft. Worth Regional ranked fifth; and Miami International ranked eighth.

It should be noted that Dallas-Ft. Worth Regional Airport was commissioned in 1974. To obtain a continuous series when operations data was totaled over all top 20 airports, operations at Dallas Love Field was used as a proxy for activity at Dallas-Ft. Worth Regional for the years 1960 to 1972. However, Dallas Love Field/Dallas-Ft. Worth Regional data should not be used for comparing activity levels at individual airports over the 1960 to 1975 time frame.

- Of these airports, Los Angeles International shows the largest percent change (57.8 percent) in total operations during the 1960-1975 period. During the same period, operations at Miami International declined 11.2 percent. This compares with a 41 percent increase in operations in the same period in all top 20 airports.

- From 1960 to 1975, Los Angeles International increased 120 percent in general aviation operations (including air taxi). Most of this can be attributed to growth in air taxi operations. During the same period, general aviation operations (including air taxi) at Miami International declined 44.4 percent.

- Air carrier operations increased at the major Los Angeles and Miami airports during the 1960 to 1975 period: Los Angeles increased 57.4 percent; and Miami, 25.7 percent; as compared with 64.4 percent increase in air carrier operations at all top 20 airports.

- The decline in general aviation operations, excluding air taxi, at these large air carrier airports can be partly attributed to a decline in general aviation local operations. During the 1960 to 1975 period, general aviation local operations declined 50 percent at Los Angeles and 100 percent at Miami (there were no local G.A. operations at Miami in 1975).

- In 1975, the percentage of general aviation operations of total operations at each of these airports is as follows:

- Los Angeles, 11.8 percent; Miami, 17.5 percent; Dallas, 4.7 percent, as compared with 18.5 percent at all top 20 airports.

. The 1975 percentage of air carrier operations of total operations is as follows:

- Los Angeles, 74.6 percent; Miami, 73.7 percent; Dallas, 82.5 percent, as compared with 70 percent at all top 20 airports.

. The proportion of air taxi operations to total operations at these airports in 1975 is:

- Los Angeles, 12.7 percent; Miami, 8.8 percent; and Dallas, 12.9 percent, as compared with 10.4 percent at all 20 airports.

. General aviation local operations represented 2 percent of total operations at Los Angeles and less than 1 percent at Dallas, as compared with 1.6 percent at all top 20 airports in 1975.

(2) Other Attributes Relating to G.A. Activity

(a) Los Angeles International, Los Angeles, California (LAX)

. In 1975, there were 25 general aviation aircraft based at this airport, five less than the 30 aircraft based at the airport in 1968 (highest for the 1960-1974 period).

. Los Angeles International is located within a Group I Terminal Control Area (TCA).

. In 1974, there were two fixed-base operators at this airport, and all types of aviation fuel were available.

. Since 1969, noncommercial aircraft are not required to pay a landing fee. However, between 1961 and 1968, landing fees were charged at this airport.

- LAX is located within 17 miles of the Los Angeles central business district. The 1974 population of the SMSA was 6.9 million, down from the 1970 population which totaled 7.0 million.

(b) Dallas-Ft. Worth Regional Airport, Dallas Love Field

- In 1975, there were 153 general aviation aircraft based at Dallas Love Field, but there were no based aircraft (or fixed base operator) at Dallas-Ft. Worth Regional Airport.

- Dallas-Ft. Worth Regional is located within a Group I TCA.

- In 1974, all types of fuel were available to pilots at Dallas-Ft. Worth and Dallas Love Field.

- In 1974, Dallas-Ft. Worth assessed a landing fee on noncommercial aircraft. No landing fee was charged at Dallas Love Field in 1974 or in previous years.

- Currently, the tie-down charge for overnight parking at Dallas-Ft. Worth is $6.80 minimum, plus $1.05 per 1,000 pounds of aircraft.

- Dallas-Ft. Worth Regional Airport is located 17 miles from the downtown areas of both Dallas and Ft. Worth. In 1974, the population of Dallas' SMSA was nearly 2.5 million, an increase of about 200 thousand from the 2.3 million reported in 1970.

(c) Miami International Airport, Miami, Florida

- In 1975, there were 58 based aircraft at Miami International Airport. Six fixed base operators furnished all types of aviation fuels to G.A. aircraft.

- Miami International is located within a Group I TCA.

- In February 1974, airport authorities at Miami International established a landing fee for all aircraft. The fees, which vary depending on the weight of the aircraft are as follows:

  - $2.00 for aircraft below 15,000 lbs.

  - $4.00 for aircraft from 15,000 to 40,000 lbs.

  - 21 cents per 1,000 lbs. for all aircraft over 40,000 lbs.

- The airport is virtually saturated on the ground with no room for expansion except possibly to the west, which would involve removal of a railroad line, at great expense.

- Miami International is located approximately 5 miles from the business district of Miami. In 1974, the population of the SMSA was approximately 1.4 million, slightly more than the 1.3 million reported in 1970.

B. Specific Airports Within the 71-90 Rank

(1) Operations Activity (See Tables 19A and 19B)

- Table 19A shows operations at Greensboro/ High Point, North Carolina; Orange County Airport, Santa Ana, California; Wichita Mid-Continent, Wichita, Kansas; and Byrd International, Richmond, Virginia. In 1975, these airports were among the group of airports ranked 71-90 in air carrier operations. Greensboro ranked 73; Santa Ana ranked 74; Wichita ranked 75; and Richmond ranked 78.

- From 1960 to 1975, Santa Ana, California, has shown steady continued growth in all types of operations. During this period, Santa Ana increased 275.2 percent in total operations. Greensboro and Wichita increased about 26 percent and Richmond increased 5 percent. However, all but Santa Ana have declined in operations since the peak period of 1969.

- During the 1960 to 1975 period, Richmond, as well as Santa Ana, has shown significant growth in general aviation operations (including air taxi), increasing 100 percent. Santa Ana increased 276.4 percent in that period and Greensboro and Wichita 41 percent and 31 percent, respectively. This compares with a 98 percent increase for the 71-90 group as a whole.

- General aviation local operations have increased during the last 15 years at all airports except Greensboro. G.A. local operations declined 16.3 percent at this airport during that time. G.A. local operations increased 342.2 percent at Santa Ana, 18 percent at Wichita, and 5 percent at Richmond, from 1960 to 1975.

- In 1975, the proportion of general aviation operations to total operations at each of these airports is as follows:

  - Greensboro, 76.7 percent; Santa Ana, 93.5 percent; Wichita, 82.5 percent and Richmond, 55.9 percent, as compared with 73.9 percent for the 71 to 90 rank group.

- Air carrier operations as a proportion of total operations at these airports are:

  - Greensboro, 18.5 percent; Santa Ana, 4.4 percent; Wichita, 11.4 percent; and Richmond, 14.9 percent, as compared with 13.3 percent for the group of 71-90 ranked airports.

- The proportion of air taxi operations at these airports in 1975 is as follows:

  - Greensboro, 1.4 percent; Santa Ana, 1.9 percent; Wichita, 5.3 percent; and Richmond, 7.1 percent, as compared with 5.0 percent for the 71-90 rank group.

- General aviation local operations represented about 25 percent of total operations at Greensboro, 50.7 percent at Santa Ana, 25.4 percent at Wichita, and 12.5 percent at Richmond, as compared with 31.7 percent for the 71-90 rank group as a whole.

(2) Other Attributes Relating to G.A. Activity

(a) Greensboro/High Point/Winston-Salem Regional Airport, Greensboro, N.C.

- In 1975, there were 83 based aircraft at Greensboro/High Point Regional Airport, down significantly from the 137 reported in 1969. There are no landing fees charged at this airport. This airport has Stage III radar service.

- A recent interview with airport personnel indicated that the airport authority leases spaces to three FBO's.

- The interviewer also suggested that Stage III radar procedures have resulted in curtailing some local operations.

- This airport, in addition to being served by several regional air carriers, is the home base for a group of military helicopters.

- A fact which may affect operations at this airport appears to be depressed economic conditions of the local furniture and textile industries.

- In 1974, the population of the Greensboro/ High Point SMSA was 760 thousand, compared with 726 thousand in 1970.

(b) Orange County Airport, Santa Ana, California

- In 1975, there were 800 general aviation aircraft based at Orange County Airport. The number of based aircraft has been increasing virtually each year since 1961 when there were 324 based aircraft.

- A recent interview indicated there are about 20 fixed-base operators at this airport, of which four are major operators. All types of aviation fuel are available from these operators. This airport is equipped with Stage III radar service. No landing fees are charged.

- Orange County Airport is located about 5 miles from the central business district of Santa Ana. In 1974, the population of the Santa Ana SMSA was 1.7 million, an increase of approximately 300 thousand over the 1970 total.

(c) Wichita Mid-Continent, Wichita, Kansas

- In 1975, there were 269 general aviation aircraft based at Wichita Mid-Continent, serviced by six fixed-base operators. All types of fuels were available and no landing fees were charged.

- Wichita Mid-Continent is situated about 6 miles from downtown Wichita. In 1974, the SMSA population was 379 thousand, a decrease of about 10 thousand from the 1970 population.

- The control tower at this airport provides Stage III radar service.

(d) Byrd International, Richmond, Virginia

- In 1975, there were 89 general aviation aircraft based at Byrd Field, as compared with a high of 132 aircraft in 1970. These are serviced by three fixed-base operators. There is no landing fee at this airport.

- There appears to be no physical constraints to general aviation at Byrd. However, the increased control imposed by Stage III radar control procedures has discouraged a number of general aviation aircraft from making Byrd their home base.

- Tight security regulations also appear to be a factor affecting G.A. These regulations limit general aviation users access to terminal ramps and ground transportation and thus tend to discourage G.A. use of the airport.

- Additionally, the opening of two nearby airports (Hanover County Airport and Chesterfield County Airport) within the last five years has diverted some of the general aviation activity away from Byrd.

- Byrd Field is located about 7 miles from the Richmond, Virginia, central business district. In 1974, the population of the Richmond SMSA was approximately 576 thousand, as compared with 549 thousand in 1970.

C. Specific Airports Within the 131-150 Rank

(1) Operations Activity (See Tables 20A and 20B)

- Table 20A shows operations at New Hanover County Airport, Wilmington, North Carolina, and Smith-Reynolds Airport, Winston-Salem, North Carolina. In 1975, these airports were among the group of airports ranked 131-150 in air carrier operations: Wilmington, N.C., ranked 141; and Winston-Salem, N.C., ranked 149.

- Although the data indicate that during the 1960 to 1975 period, Wilmington, N.C., has increased in all categories of operations, and Winston-Salem has decreased, reference to Table 20A will show the growth pattern at these airports has followed the national trend wherein peaks in operations were reached about 1969, but total operations have been declining since that time.

- From 1960 to 1975, Wilmington increased 20.3 percent in total operations; Winston-Salem decreased 27.8 percent. General aviation operations (including air taxi) increased 93.9 percent at Wilmington and declined 21.4 percent at Winston-Salem. General aviation local operations increased 32 percent at Wilmington and decreased 37 percent at Winston-Salem. Similarly, air carrier operations increased 57.2 percent at Wilmington and declined 52.4 percent at Winston-Salem.

- In 1975, the proportion of general aviation operations to total operations at each of these airports is as follows:

  - Wilmington, 67.4 percent; Winston-Salem, 89.0 percent, as compared with 80.2 percent for all airports in the 131-150 group rank.

- The proportions of air carrier operations to total operations in 1975 are:

  - Wilmington, 11.6 percent; Winston-Salem, 11.0 percent, as compared with 9.2 percent for all airports in the 131-150 group.

- In 1975, air taxi operations were negligible (less than 1 percent) at both these airports.

General aviation local operations represented 26.3 percent of total operations at Wilmington and 35.2 percent at Winston-Salem in 1975, as compared with 34.6 percent for all airports in the 131-150 group rank.

(2) Other Attributes Relating to G.A. Activity at Specific Airports

(a) New Hanover County, Wilmington, N.C.

- In 1975, there were 56 general aviation aircraft based at New Hanover County Airport, served by two fixed-base operators. Fuel is available for general aviation aircraft.

- Until one year ago, New Hanover County served as the base for a group of F-106 type military aircraft.

- New Hanover County is the only airport in the metropolitan area and so there are no interactions in the traffic patterns with aircraft from other airfields. The airport also serves as a training base for Piedmont Airlines.

- In 1974, the population of the area was 127 thousand, an increase over the 108 thousand reported in 1970.

(b) Smith-Reynolds Airport, Winston-Salem, N.C.

- In 1975, there were 168 general aviation aircraft based at Smith-Reynolds. There is one full service fixed-base operator at Smith-Reynolds Airport. This airport also serves as general headquarters for Piedmont Airlines. A limited amount of service is available to G.A. aircraft at Piedmont's facilities. Landing fees were charged at this airport from 1967 to 1969. Currently, however, there are no landing fees. The airport is equipped with Stage III radar service.

- In 1974, the population of the Winston-Salem SMSA was 760 thousand, as compared with 726 thousand in 1970.

Table 21 presents a summary of specific characteristics of the selected airports. Information (latest available) is provided on number of based aircraft, number of fixed-base operators, landing fees, fuel availability, distance to and population of the nearest metropolitan area.

From the information reported, it was found that fuel is generally available to general aviation aircraft at the airports studied. Additionally, most of the airports did not have landing fees for general aviation aircraft. Thus, these two factors do not appear to constrain general aviation at these airports at this time.

Virtually all of the airports have at least one fixed-base operator, and in the case of Orange County Airport (Santa Ana, Ca.) where there are a large number of based aircraft, there is a corresponding large number of fixed base operators.

It has been shown previously that there are very few general aviation local operations at the large air carrier airports of Miami, Los Angeles, and Dallas-Ft. Worth (about 1 to 2 percent of total operations). These airports are located in Group I terminal control areas (TCA). This type of control area implies that an aircraft entering it must be equipped with certain types of avionics equipment and must be under positive

control at all times. This type of control area can only discourage general aviation, especially local practice flying. Furthermore, student flying is prohibited in such areas. Additional discussion of TCA's can be found on page 53.

General aviation flying may also be inhibited at airports equipped with Stage III radar service.

On-site visits with airport authorities, i.e., FAA, sponsors, FBO's, et.al. indicate the behavior of based aircraft and operations at various airports reflect the notions that (1) intensive carrier operations drive out general aviation, especially local flying; (2) as the population of an area served by an airport stabilizes in number and per capita income, operations stabilize; and (3) as the population ages, flying declines in popularity.

D. Additional Analysis

In an attempt to get further information on certain other attributes on which little data could be gathered or on which available data proved inconclusive, a general aviation cost model 16/ was applied to confirm the assumption that changes in fuel cost, for example, affected general aviation activity. A 20 percent increase above current levels of fuel cost was assumed starting in 1977. The model provided the results of such an impact on the number of hours flown by year to the year 1986. These data were presented over nine categories of general aviation (instructional, personal, executive, business, air taxi, commuter, rental, industrial, and aerial). The impacts were further aggregated over seven types of aircraft (single-engine piston - one to three place, single-engine piston - 4 place and over, twin-engine piston - under 12,500 lbs., twin-engine and multi-engine - piston over 12,500 lbs., twin-engine turboprop, twin-engine and multi-engine turbojet, and rotary wing-piston and turbine).

16/ This model was developed for the Office of Aviation Policy in conjunction with a contract study entitled, "General Aviation - Methodology For Determining Regulatory and System Impact," developed by Decision Sciences Corporation, January 1976.

Appendix D contains tables indicating the impact of changes in fuel and maintenance costs on 1977 general aviation flying hours. Table 25 displays the impact of the hypothetical 20 percent fuel and oil cost increase for the year 1977. As can be seen from that table, such a cost increase would result in:

- A reduction in the total number of anticipated G.A. flight hours in 1977 alone by 8.5 percent from 38.9 million hours to 35.6 million hours. The personal use category would be hardest hit with a reduction of 12.4 percent, from 10.1 million hours to 8.9 million hours; and in that category the single engine piston aircraft (four seat and over) would receive the greatest numerical impact with a reduction of over 900,000 hours of flying time (see Table 26).

On a subject related to the availability of FBO's, the impact of a 20 percent increase in airframe, on top of the hypothetical 20 percent increase in fuel and oil costs, was analyzed. Such an increase in airframe maintenance cost could come about as a result of reduced numbers of FBO services causing less competition and greater physical inconvenience to G.A. owners. Additionally, trends towards more sophisticated G.A. aircraft could also reinforce this factor. This additional hypothetical increase, when compounded by the fuel/oil cost increase, would result in:

- An overall 12.4 percent reduction in G.A. flying hours in 1977 below the level currently anticipated. Again, personal use flying would sustain the brunt of this impact with a reduction of 17.4 percent, or over 1.7 million less flying hours than presently anticipated in 1977 (see Table 27).

It is interesting to note that certain elements of G.A. flying are less impacted by these hypothetical cost increases than others. Additionally, cross-overs or transfers of general aviation flying are seen to occur at the expense of the more cost-sensitive categories such as personal use and instructional flying.

On the question of "promotion of aviation," it was found that if a reduction in G.A. terminal delays could be realized (either by operational, regulatory

or programmatic improvements) so that the costs of flying, e.g., fuel and oil, were reduced by 5 percent by the end of 1976, the following would occur:

- In 1977 alone, flying hours of all G.A. aircraft would exceed currently anticipated levels by 3.7 percent or by over 1.4 million hours. Again, personal use flying would sustain the greatest numerical impact with an increase of over 500 thousand additional hours (see Table 28).

It still remains to distribute these hypothetical increases or decreases to lower levels of aggregation. This must be done to identify the airports having potential future problems of airside capacity/delay, noise, ground access and so forth. In order to accomplish this, many site-specific factors must be taken into consideration, such as the existence or future potential need for TCA's.

A sample survey of general aviation aircraft owners was completed recently for the FAA by the Bureau of the Census. The survey showed that only 3.6 percent of the single engine piston aircraft, one to three seats, and only 21.2 percent of the single engine piston with four or more seats are currently transponder equipped. Thus the existence of a TCA at a specific airport has a tremendous bearing on the future growth of G.A. at that airport since single engine piston aircraft currently represent 82 percent of the entire G.A. fleet. This point was also made by G.A. representatives at a "listening session" sponsored by the FAA Central Region Office in April 1976.

In summary, the model analysis work indicates that the impact of any increase in fixed or variable operating costs, whether it be for landing fees, maintenance, tie-down fees, training, et.al., can be expected to drive down the general aviation flying hours below presently anticipated levels. Conversely, actions taken to reduce such costs will act to stimulate G.A. growth.

6. Additional Forces Impacting G.A.

A. Introduction

The previous chapter discussed factors potentially contributing to general aviation trends at groups of airports as well as at specific airport locations. Some of the factors contributing to these specific G.A. airport trends obviously also impact on the national scene as well. This chapter will touch upon those national level forces not yet discussed or discussed only briefly. This information will be presented for factors or forces already in effect as well as for those forces seen to be developing with potential impact on general aviation. Section B will deal with the forces already in effect, while section C discusses developing forces.

B. Forces Already in Effect

The most significant of these current forces include the following:

(1) Facility Establishment Criteria

The concept of establishment criteria was first applied to terminal facilities and services with the implementation of Airway Planning Standard (APS) #1 in March 1951. The purpose of the APS series is to provide an orderly means of establishing air traffic control and navigation facilities in accordance with aeronautical need and FAA policy. The criteria contained in planning standards were developed to insure that the resources available to the FAA and its predecessor organizations would be allocated in such a way that urgent requirements for air traffic control facilities and services at public airports would be satisfied in a priority of aeronautical need.

Establishment criteria were initially developed for five major terminal facilities: Air Traffic Control Towers (ATCT), Instrument Landing Systems (ILS), Airport Surveillance Radar (ASR), Precision Approach Radar (PAR), and Terminal Omnirange Facilities (TVOR). As experience was gained in the application of these criteria,

they were changed to better meet the requirements of the aviation users. New establishment criteria were developed to implement additional facilities and services that were introduced by FAA in response to the increasing volume of air traffic.

The next major step was to relate establishment criteria to cost per operation. In 1975, the FAA completed four analytical studies that developed revised establishment and discontinuance criteria for ATCT, ASR, ILS, and Airport Surveillance Detection Equipment (ASDE). These studies used a benefit versus cost technique and are part of an effort to place Facilities and Equipment (F&E) criteria on a more rational economic basis and to direct Federal funds to investments which have the greatest potential payoff per dollar spent.

The revised criteria are forecast by 1986 to identify 55 percent fewer ATCT locations than would have been identified by the previous criteria. The revised ASR criteria are forecast by 1986 to identify 2 percent more ASR's than would have been identified by the previous criteria. The revised ILS criteria are forecast by 1986 to identify 5 percent fewer ILS's than would have been identified by the previous criteria. There was no establishment criteria for ASDE until the current effort which identified 37 total potential airport locations by 1986.

The following is a comparison of the previous and revised establishment criteria for air carrier and general aviation operations:

	PREVIOUS		REVISED	
FACILITY	A/C (annual itinerant ops)	GA (annual itinerant ops)	A/C (annual itinerant ops)	GA (annual itinerant ops)
ATCT	24,000	50,000	15,000	200,000
ASR	10,000	50,000	4,000	105,000
ILS	scheduled turbojet or 700 AIA*	700 AIA	scheduled turbojet or 150 AIA (average)	1,800 AIA (average)
ASDE	None	None	100,000 AIA	180,000 AIA

* Annual Instrument Approaches

The primary impacts of the revised criteria are to lower establishment levels at air carrier airports and to raise them at general aviation airports.

(2) Recent Regulatory Actions

(a) Revised Pilot Certification Requirements - Effective November 1, 1973, under FAR Part 61, extensive regulatory actions were undertaken to enhance operational safety which included more stringent requirements in training, testing, and certification in virtually all pilot categories.

In the private pilot category, there is more emphasis on flight instruction and operational problem areas. Applicants for private pilot certificates must demonstrate, among other things, ability to conduct such operations as controlling and maneuvering an airplane solely by reference to instruments, including descents and climbs using radio aids or radar directives; airport and traffic pattern operation including collision avoidance practice; flight at critically slow airspeeds including recognition and recovery from imminent and full stalls; and emergency operations including simulated aircraft and equipment malfunctions.

To qualify in the commercial pilot category, applicants are now required under Part 61 to have a total of at least 250 hours of flight time rather than the 200 hours previously required. The number of hours of flight instruction required was also increased from 20 hours to 50 hours, and applicants must have 10 hours of training in complex aircraft--those having flaps and a controllable pitch propeller and retractable landing gear. Requirements for instrument ratings were also strengthened; applicants must have 10 hours of instrument instruction, of which at least five hours must be in flight in airplanes.

(b) Terminal Control Areas (TCA) - Terminal Control Areas evolve from the 1968 Near

Mid-air Collision Study which revealed that 97 percent of the near misses in terminal areas happened below 8,000 feet above ground level and that the vast majority of conflicts involved general aviation aircraft. Furthermore, it noted that a mix of uncontrolled VFR aircraft and controlled IFR aircraft was a basic cause for the air traffic conflicts. Terminal Control Areas consist of controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in Part 91 of the FAR's. Each such location is designated as a Group I, Group II, or Group III Terminal Control Area according to traffic density; and they differ primarily in equipment requirements and operating rules. There are nine large hub locations designated as Group I TCA; the next 12 large hub locations are designated as Group II TCA. Forty-two Group III TCA's were initially proposed; however, there are no present plans to activate these locations.

(c) Increased separation standards between small, large, and heavy aircraft - New procedures requiring air traffic controllers to provide an extra mile of separation between large and small aircraft because of possible effects of wake turbulence became effective November 1, 1975.

The FAA has taken this safety action as a result of recent studies which indicate that turbulence in the wake of large and heavy aircraft is strong enough to warrant an increase in the landing separation standards as a precautionary safety measure.

Under the new procedures, FAA has required a six-mile separation for small aircraft landing behind heavy aircraft and a four-mile separation for small aircraft landing behind large aircraft. This additional mile of separation is required at the time the preceding aircraft is over the end of the runway.

Among the aircraft in the heavy category (300,000 lbs. or more) are the DC-10, L-1011, B-747, the C5A military cargo plane, and the larger versions of the B-707 and DC-8. Large aircraft (12,500-300,000 lbs.) include the B-727, B-737, the smaller B-707 and DC-8, and certain business aircraft such as the Sabreliner and Jetstar. The small category (12,500 lbs. or less) covers most general aviation aircraft, including air taxis.

(d) Emergency Locator Transmitters - After June 30, 1974, most general aviation aircraft were required to be equipped with an emergency locator transmitter (ELT) and must have the ELT armed during flight. Powered by a self-contained battery, an ELT emits a distinctive, warbling signal on international emergency frequencies, 121.5 and 243.0 MHz, when activated. The distress signal alerts search and rescue units such as those of the Coast Guard, Air Force, and Civil Air Patrol.

U.S. registered civil airplanes not required to have an ELT are turbojet-powered aircraft; aircraft engaged in scheduled flights by scheduled air carriers certificated by the CAB; aircraft engaged in training operations conducted entirely within a 50-mile radius of the airport; flight operations incident to design and testing; new aircraft while engaged in flight operations incident to their manufacture, preparation, and testing; agricultural aircraft operations; aircraft certificated for R&D purposes; aircraft used for showing compliance with regulations; crew training, air racing, or market surveys; and aircraft equipped to carry not more than one person.

(e) Cockpit Voice Recorders/Flight Data Recorders -

FAA required that as of May 15, 1975, air taxi operators using business-type jets must equip these aircraft with cockpit

voice recorders and flight data recorders which are to be operated continuously throughout the flight.

This action by FAA implemented provisions of a regulation adopted in November 1969 which required air taxi and other operators certificated under Part 135 of the FAR's to meet the same basic safety requirements as supplemental air carriers when operating large aircraft (those over 12,500 lbs.).

In taking this action, FAA denied a position from the National Air Transportation Association and Executive Air Fleet Corporation which argued that these requirements should not apply to business-type jets because of their small size and load capacity. FAA concluded that the assistance provided by the two recorders in accident investigation outweighed all other considerations.

(f) Transponders - Effective July 1, 1975, ATC radar beacon transponders were required in all U.S. registered civil aircraft operating in controlled airspace of the 48 contiguous states and the District of Columbia above 12,500 feet MSL, excluding the airspace at and below 2,500 feet AGL.

The airborne unit required by this rule is an operable coded radar beacon transponder having a Mode 3/A 4096-code capability, replying to Mode 3/A interrogation with the code specified by ATC, and is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This equipment transmits aircraft identity and altitude information for display directly on the radar scopes used by air traffic controllers.

One realization of the regulatory actions listed above is that increased sophistication and continued demand for safety in the National Aviation System are imposing ever-increasing

rules and requirements upon general aviation. Overcrowding of our airports and airspace has pointed to this necessity for the last decade at least.

Among the specific impacts of these actions on general aviation are: increased equipage and other costs; and further delay in utilization of the system.

C. Developing Forces

Potential major developing forces impacting general aviation include the following:

(1) Revised User charges

The rapid growth of all aspects of aviation since World War II led to rising Federal costs for the Airport and Airway System. These rising costs focused increased attention on the question of how they should be financed.

In an effort to lighten the burden of costs borne by the general taxpayers, Presidents Truman, Eisenhower, Kennedy, and Johnson made proposals for aviation user charge systems. None of these proposals became law. However, due to an upsurge in air traffic in the 1960's which caused frequent delays and severe congestion in the airspace and at major airports, President Nixon proposed and Congress passed the Airport and Airway Development Act of 1970. This Act authorized a long-range program for expansion and improvement of the Nation's airports and airways. It was to be financed, in large part, by new levies on the users of the system.

The Act levied user taxes on aviation fuels, domestic airline fares, departing international passengers, domestic air freight, aircraft tires and tubes, and aircraft registration. Revenues from these user taxes are paid into the Airport and Airway Trust Fund. Although the new taxes represented a start in recovering the costs from the direct user, it was clearly recognized in the DOT Cost Allocation Study as only an interim approach to an overall user charge system.

The gap between the costs allocated to general aviation and the revenues received is large and growing. In 1971, it exceeded $200 million, and by the end of 1975, was projected to exceed $400 million. At the same time, tax receipts from general aviation as a percentage of allocated costs are falling. In 1971, general aviation tax receipts covered approximately 22 percent of the allocated costs, but the number was projected to fall to 18 percent by the end of 1975. These trends reflect two factors. First, general aviation is growing in absolute terms and its use of the Airport and Airway System is growing even more rapidly. Second, because taxes are now only indirectly related to costs imposed by general aviation, cost recovery does not necessarily reflect the increasing use of costly facilities. The Administration is seeking a revised fuel tax and user charge program to recover from actual users more of the costs incurred by the Federal Government in providing airport and airway services.

The proposed program calls for increasing the tax on noncommercial use of aviation fuel from 7 cents to 15 cents per gallon for the next three years then reducing it to 10 cents per gallon, with the states being given authority to assume the other 5 cents per gallon at that time. Anticipated annual revenue from the proposed 15-cent fuel tax would be about $116 million, an increase in the general aviation payment of $62 million. This only partially covers the deficit between revenues from general aviation and costs of airways services used by this segment of aviation.

The new program also proposes fees to cover certain FAA administrative costs of certification and licensing of aircraft, airmen, and aircraft equipment and a request for Congress to repeal the current prohibition against the use of passenger "head-tax" charges by state and local governments. Substantial costs--$35 million in FY 75--are incurred by the FAA in certifying and licensing airmen, aircraft, and aircraft equipment. Historically, the Government has attempted to charge for such services when they benefit individuals significantly more than the

general public. Hence, fees to cover the administrative costs of these services are under consideration for implementation through rulemaking procedures.

If the Administration's program becomes law, a more equitable state will have been achieved in allocating system costs among system users. However, since general aviation has, in the past, paid less than its equitable share, correction of the situation now or in the future is expected to constrain general aviation growth to lower levels than if that correction did not take place.

(2) New Federalism

This force was briefly mentioned in Chapter 2 (Introduction and Purpose) as being one of the major new FAA policy directions. The philosophy of New Federalism, in essence, is the relinquishment of Federal control where state or local jurisdictional control is feasible. The translation of this philosophy into action is evidenced in the House and Senate bills dealing with the new Airport Development Aid Program legislation, both of which are presently before the Congress. These bills would expand the state role in the development of general aviation airport facilities.

It is believed that this developing force will allow the occurrence of more timely and appropriate decisionmaking regarding GA airport development than would be the case if that responsibility remained solely with the Federal Government. At the same time, however, the "promotion" of general aviation (at least at the airport level) would appear to be delegated to the state/local government by virtue of the "New Federalism" philosophy.

7. Potential Future Policy Considerations

In Chapter 2 some specific questions were raised regarding general aviation. The bulk of these questions involved the identification of current forces on general aviation and the impacts of those forces.

Chapters 4-6 provided: data concerning trends in general aviation at the national and airport levels; analysis of differences between these levels; and an enunciation of the forces impacting this important segment of the aviation community.

One major question remains, however. That being, "What are the policies FAA may consider in the future which could also impact general aviation?"

The preceding Chapters set the stage from which this question must be addressed. A reiteration of this scenario follows:

- At the national level, general aviation predominates the aviation segment of transportation in significant FAA parameters such as: the total number of aircraft (98 percent in 1975); and in the total number of all operations as well as in itinerant, local and instrument operations at towered airports (76 percent, 65 percent, 94 percent and 43 percent, respectively, in 1975).

- At the national level, general aviation is expected to continue to increase its share of these parameters, i.e., numbers of aircraft and operations.

- At the larger air carrier airports, general aviation represents a much lesser share of these parameters, and those shares have been decreasing over time and are expected to continue to do so.

- Some of the forces attributed to reduced general aviation activity at the larger airports include: higher costs and tighter regulatory conditions for G.A.

- Elements of general aviation see themselves discriminated against and point to these forces as manifestations of that discrimination. At the same time, the DOT/FAA view contends that G.A. has not paid its fair share of total system costs in the past and will not do so in the future unless changes are made in the "user charge" structure.

. Elements of general aviation reject this DOT/FAA view and demand that FAA, "encourage and foster the development of civil aeronautics... (including general aviation)..." as called for in the FAA Act of 1958.

In light of the above scenario, two diverse courses of legislative action are seen to control FAA's future policy considerations. The first course is no legislative change in the present "user charge" structure. The second course is an accommodation of the administration's attempts to reform the "user charge" structure and bring about an equitable increase in the share paid by G.A.

The following Potential Future Policy Considerations have accordingly been divided by these two courses of legislative action:

A. <u>With the User Charge Structure Unchanged</u>

With increasing activity forecast among all elements of the industry, system capacity will be pushed to the point where larger investments of equipment and personnel are required to meet the demand. In consideration of the administration's charge to "insure the safety of aircraft and the <u>efficient</u> (emphasis added) utilization of...airspace," (Section 307(a) of the Federal Aviation Act of 1958) the following policy considerations become significant:

(1) Will the current system mechanisms (regulations, economics, et.al.) automatically adjust for the increased demands on the system? If so, can further eroding of G.A. activity at large airports be expected?

(2) Are the current system mechanisms optimal or are other actions more effective?

(3) What other actions should be considered?

- Peak hour restrictions on general aviation aircraft at large air carrier airports?

- Variable landing fees imposed on all aircraft at highly congested airports with peak hour operations costing the most?

- Restructuring of the level of service provided to general aviation to bring about a more equitable balance between benefits received by G.A. and costs paid by G.A. for those benefits?

  -- What levels of service should be considered at airports? at FSS's? in the airspace?

(4) What are the tradeoffs between insuring "efficient utilization of...airspace" and "encouraging and fostering the development of civil aeronautics..."?

B. <u>With a Modification of the Current User Charge Structure</u>

If the current cost structure is modified, certain additional policy considerations become significant:

(1) If the existing marketplace mechanisms are not accommodating the needs of G.A. at the larger air carrier airports, should the Federal Government move into those areas? i.e., call for guaranteed G.A. tie-down facilities at airports receiving Federal funding; require pilot training facilities; et.al.

(2) How can the level of any modified cost structure best be implemented without imposing the burden of additional costs on those elements of general aviation that do not desire or require sophisticated services?

8. Conclusions and Additional Work Required

Trends in key general aviation parameters have been shown at both the national and airport levels of aggregation. Comparisons between the two levels generally indicate that general aviation is growing at airports in an inverse proportion to the level of air carrier activity at those airports. The perceived causes for this phenomenon include: lack of G.A. facilities; regulatory restraints on operations; and higher costs associated with operating at large air carrier airports.

Potential future policy considerations impacting general aviation range from continuation of the existing market mechanisms to development of additional regulations and requirements. Before analysis and consideration of this range of alternatives can go forward, additional information and data are required.

Total involvement of all the elements of this significant class of aviation is required if success is to be achieved. The general aviation community is urged to participate and to provide necessary inputs needed to make the policy development process effective. More specifically, these inputs include information and data related to the following:

A. General Aviation Elasticities

(1) To what degree do availability of services relate to general aviation activity at a given airport, i.e., FBO's, fuel, training, tie-down facilities, ground access?

(2) To what degree does proximity of the airport to the Central Business District (CBD) relate to general aviation activities?

(3) What are the elasticities related to various fees and charges? For example, at what point will the primary airport location with a landing fee or higher fuel costs be rejected by the G.A. user for a less geographically optimal location with lower costs?

(4) If availability of services, cost and regulatory restrictions were not factors, how much increased G.A. activity would occur at the large air carrier airports?

B. General Aviation Service Requirements

Elements within G.A. have often contended that the sophistication of the system as now constituted is primarily for the benefit of the air carriers, not the general aviation user. Therefore:

(1) What specific existing nonsafety related services or requirements should be modified as they relate to G.A. and how?

(2) What specific new G.A. services should FAA consider providing at the airport and in the airspace?

The above are but a few of the data gaps and information requirements we perceive in just two generic areas. This listing is not in the least intended to be exhaustive. Providing the system capability when needed, in the safest, most cost-effective manner, requires a total industry effort in, first, determining and defining the problems and then, jointly developing the most equitable solutions.

APPENDIX A

National-Level Data
Regarding
General Aviation

Table 1

U.S. ACTIVE GENERAL AVIATION FLEET

Selected Years 1940-1975

(In Thousands of Aircraft)

		YEAR	NUMBER OF AIRCRAFT	
		1940	17.3	
Average Annual Growth Rate:		1945	29.0	
		1955	57.4	Average Annual Growth Rate: 7.5%
		1956	58.8	
1955-1960:	3.5%	1957	62.9	
		1958	65.3	
		1959	67.8	
		1960	68.7	
		1961	76.5	
1960-1965:	5.0%	1962	80.6	
		1963	84.1	
		1964	85.1	
		1965	88.7	
		1966	95.4	
1965-1970:	8.0%	1967	104.7	Average Annual Growth Rate: 5.5%
		1968	114.2	
		1969	124.2	
		1970	130.8	
		1971	131.7	
1970-1975:	4.0%	1972	131.1	
		1973	145.0	
		1974	153.5	
		1975	161.5	

NOTE: As of January 1, 1975, active civil aircraft in the U.S. totaled 164,160. This included 161,502 general aviation aircraft and 2,658 air carrier aircraft.

Source: FAA Statistical Handbook of Aviation, Federal Aviation Administration, Washington, D.C. (Selected Editions).
Aviation Forecasts--Fiscal Years 1976-1987, U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C. September 1975.

Table 2

GENERAL AVIATION ACTIVE AIRCRAFT BY TYPE 1961-1975
(In thousands)

Period as of January 1	Fixed Wing Piston Single-engine	Fixed Wing Piston Multi-engine	Fixed Wing Turbine	Rotorcraft	Other	Total
1961	68.0	- 7.5	-	0.6	0.4	76.6
1962	71.0	8.2	0.2	0.8	0.4	80.6
1963	73.5	9.0	0.2	1.0	0.5	84.1
1964	73.6	9.5	0.2	1.2	0.6	85.1
1965	76.1	10.3	0.3	1.3	0.6	88.7
1966	81.1	11.4	0.6	1.5	0.8	95.4
1967	88.6	12.7	0.9	1.6	0.9	104.7
1968	96.5	13.4	1.3	1.9	1.1	114.2
1969	103.7	15.0	1.8	2.4	1.3	124.2
1970	108.7	15.9	2.2	2.6	1.4	130.8
1971	109.5	16.0	2.4	2.3	1.6	131.7
1972	109.1	15.5	2.5	2.4	1.7	131.1
1973	120.4	17.3	2.6	2.8	1.9	145.0
1974	126.1	18.7	3.3	3.1	2.3	153.5
1975	131.9	19.8	3.7	3.6	2.5	161.5

Source: FAA Statistical Handbook of Aviation,
U.S. Department of Transportation, Washington, D.C.
(Selected Editions)

Table 3

HOURS FLOWN IN GENERAL AVIATION
BY TYPE OF AIRCRAFT: 1960-1974
(In millions)

	Fixed Wing					
	Piston					
Year	Single-Engine	Multi-Engine	Turbine	Rotorcraft	Other	Total
1960	9.8	- 2.2	-	0.2	0.02	12.2
1961	10.0	2.3	0.06	0.2	0.02	12.6
1962	10.6	2.4	0.09	0.3	0.04	13.4
1963	11.8	2.7	0.1	0.4	0.05	15.1
1964	12.2	2.9	0.1	0.4	0.06	15.7
1965	13.0	3.0	0.2	0.4	0.07	16.7
1966	16.2	3.8	0.4	0.5	0.07	21.0
1967	17.5	3.5	0.5	0.5	0.07	22.1
1968	18.9	3.6	0.7	0.6	0.1	24.0
1969	19.5	3.9	1.0	0.8	0.1	25.3
1970	19.2	4.4	1.4	0.9	0.1	26.0
1971	18.9	4.1	1.4	0.9	0.2	25.5
1972	19.9	4.4	1.5	1.0	0.2	27.0
1973	21.8	5.0	1.8	1.2	0.2	30.0
1974	23.1	5.4	2.1	1.4	0.5	32.5

Source: FAA Statistical Handbook of Aviation, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 4

ESTIMATED HOURS FLOWN IN
GENERAL AVIATION BY TYPE OF FLYING
1960-1974

(In millions)

Year	Business		Commercial		Instructional		Personal		Other		Total 1/	
	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%
1960	5.7	43	2.4	18	1.8	14	3.2	24	0.06	1	13.1	100
1961	5.7	42	2.6	19	1.8	13	3.4	25	0.08	1	13.6	100
1962	5.4	37	3.1	21	2.4	17	3.5	24	0.1	1	14.5	100
1963	5.7	38	3.2	21	2.4	16	3.6	24	.2	1	15.1	100
1964	5.8	37	3.3	21	2.7	17	3.8	24	.2	1	15.7	100
1965	5.9	35	3.3	20	3.3	20	4.0	24	.2	1	16.7	100
1966	7.1	33	3.6	17	5.7	27	4.5	22	.2	1	21.0	100
1967	6.6	30	3.9	18	6.3	28	5.2	23	.2	1	22.2	100
1968	7.0	29	4.8	20	6.5	27	5.5	23	.2	1	24.1	100
1969	7.1	28	4.9	19	7.0	28	6.0	24	.3	1	25.4	100
1970	7.2	28	4.6	18	7.0	26	6.9	26	.6	2	26.0	100
1971	7.1	28	4.3	17	6.4	25	7.3	28	.4	2	25.5	100
1972	7.2	27	4.8	18	6.8	25	7.6	28	.5	2	27.0	100
1973	8.6	28	5.6	19	7.6	25	7.5	25	.7	3	30.0	100
1974	9.1	28	6.3	19	8.0	25	8.4	26	.7	2	32.5	100

1/ Numbers in individual categories may not add to total because of rounding.

Note: 1. Business includes business and executive.
2. Commercial includes air taxi, aerial application, and industrial/special.
3. Instructional includes training and rental.

Source: Census of U.S. Civil Aircraft, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 5

ESTIMATED MILES FLOWN IN
GENERAL AVIATION BY TYPE OF FLYING
1960-1974

(In millions)

Year	Business		Commercial		Instructional		Personal		Other		Total	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
1960	881	50	299	17	194	11	387	22	8	1	1,769	100
1961	888	48	333	18	203	11	425	23	9	1	1,858	100
1962	935	47	367	19	256	13	388	20	20	1	1,965	100
1963	983	48	369	18	266	13	410	20	20	1	2,048	100
1964	1,047	48	393	18	284	13	436	20	21	1	2,181	100
1965	1,204	47	461	18	359	14	512	20	26	1	2,562	100
1966	1,536	46	516	16	646	19	606	18	32	1	3,336	100
1967	1,431	42	569	16	713	21	691	20	36	1	3,440	100
1968	1,406	38	666	18	814	22	777	21	37	1	3,701	100
1969	1,426	36	723	18	910	23	829	21	38	1	3,926	100
1970	1,134	35	555	17	686	21	753	24	79	2	3,207	100
1971	1,129	36	506	16	651	21	795	25	62	2	3,143	100
1972	1,144	34	581	18	692	21	834	25	67	2	3,317	100
1973	1,344	36	688	18	779	21	825	22	93	3	3,729	100
1974	1,433	35	790	20	815	20	920	23	85	2	4,043	100

Note: Individual percentages may not add to 100 percent due to rounding.

1. Business includes business and executive.
2. Commercial includes air taxi, aerial application, and industrial/special.
3. Instructional includes training and rental.

Source: FAA Statistical Handbook of Aviation, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 6

ACTIVE GENERAL AVIATION AIRCRAFT
BY TYPE OF AIRCRAFT AND PRIMARY USE
January 1, 1975

PRIMARY USE	TYPE OF AIRCRAFT											
	Single-Engine Piston		Multi-Engine Piston		Turbine		Rotorcraft		Other Aircraft		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Business	27,296	20.7	11,986	60.6	2,915	78.8	728	20.2	127	5.0	43,052	26.7
Commercial	9,320	7.1	3,374	17.1	528	14.3	2,006	55.5	27	1.1	15,255	9.4
Instructional	18,624	14.1	1,113	5.6	34	.9	249	6.9	507	19.9	20,527	12.7
Personal	73,878	56.0	2,732	13.8	45	1.2	360	10.0	1,661	65.3	78,676	48.7
Other Use	2,746	2.1	582	2.9	177	4.8	267	7.4	220	8.7	3,992	2.5
Total	131,864	100.0	19,787	100.0	3,699	100.0	3,610	100.0	2,542	100.0	161,502	100.0

Business includes business and executive.
Commercial includes air taxi, aerial application, industrial/special.
Instructional includes training and rental.

Source: FAA Statistical Handbook of Aviation, Calendar Year 1974, U.S. Department of Transportation, Washington, D.C.

Table 7

U.S. GENERAL AVIATION UNIT SHIPMENTS
BY TYPE OF AIRCRAFT
1960-1975

Year	Single-Engine 1- to 3-place		Single-Engine 4-place & over		Multi-Engine		Rotorcraft All Types		Total[2/]	
	Number	%	Number	%	Number	%	Number	%	Number	%
1960	1,366	17.2	5,072	63.9	1,288	16.2	217	2.7	7,943	100.0
1961	2,159	29.8	3,821	52.8	963	13.3	291	4.0	7,234	100.0
1962	1,247	17.6	4,518	63.6	1,032	14.5	306	4.3	7,103	100.0
1963	1,404	17.5	4,913	61.1	1,311	16.3	413	5.1	8,041	100.0
1964	2,187	22.1	5,625	56.8	1,637	16.5	450[1/]	4.5	9,899	100.0
1965	3,545	28.7	6,478	52.5	2,030	16.4	290	2.3	12,343	100.0
1966	5,744	35.8	7,482	46.7	2,497	15.6	312	1.9	16,035	100.0
1967	4,873	34.9	6,657	47.7	2,006	14.4	424	3.0	13,960	100.0
1968	4,507	31.6	6,972	48.9	2,270	15.9	504	3.5	14,253	100.0
1969	4,447	34.0	5,746	44.0	2,388	18.3	489	3.7	13,070	100.0
1970	1,981	25.2	4,049	51.5	1,354	17.2	482	6.1	7,866	100.0
1971	1,948	24.7	4,329	54.8	1,173	14.9	443	5.6	7,893	100.0
1972	2,398	23.3	5,500	53.5	1,867	18.2	509	5.0	10,274	100.0
1973	3,137	21.7	7,681	53.2	2,853	19.8	774	5.4	14,445	100.0
1974	3,346	22.6	8,124	54.8	2,556	17.2	808	5.4	14,834	100.0
1975[3/]	3,047	20.5	8,460	56.8	2,536	17.0	839	5.6	14,882	100.0

1/ Data for 1960 to 1964 include rotorcraft produced for civilian transports and general aviation.
2/ Details may not add to total because of rounding.
3/ Preliminary.

Source: FAA Statistical Handbook, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 8

U.S. GENERAL AVIATION FIXED-WING SHIPMENTS

1960-1974

Year	Number of Aircraft	Dollar Value of Units ($000)	Average Unit Cost
1960	7,726	$177,213	$22,937
1961	6,943	151,302	21,792
1962	6,797	156,816	23,071
1963	7,628	174,201	22,837
1964	9,459	236,859	25,041
1965	12,053	379,972	31,509
1966	15,723	471,120	29,964
1967	13,536	410,387	30,318
1968	13,749	553,186	40,235
1969	12,581	581,807	46,245
1970	7,384	339,887	46,030
1971	7,450	309,426	41,534
1972	10,677	536,783	50,275
1973	13,671	810,534	59,288
1974	14,026	884,166	63,038

Source: FAA Statistical Handbook of Aviation, (Selected Editions), Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 9

NUMBER OF FAA TOWERED AIRPORTS
OPERATIONS AT FAA TOWERED AIRPORTS

1960-1975

Year	Number of FAA Towers	Air Carrier Number (000)	Air Carrier % of Total	Military Number (000)	Military % of Total	General Aviation Number (000)	General Aviation % of Total	Air Taxi[1/] Number (000)	Air Taxi[1/] % of Total	Total Number (000)
1960	229	7,164	28%	3,784	15%	14,826	57%	-	-	25,774
1961	254	6,980	27	3,793	14	15,528	59	-	-	26,301
1962	270	7,060	25	3,774	13	17,367	62	-	-	28,201
1963	277	7,340	24	3,716	12	19,921	64	-	-	30,977
1964	278	7,447	22	3,727	11	23,020	67	-	-	34,194
1965	292	7,819	21	3,479	9	26,573	70	-	-	37,871
1966	303	8,206	18	3,301	7	33,445	74	-	-	44,952
1967	313	9,360	19	3,304	7	37,223	74	-	-	49,887
1968	322	10,377	19	3,351	6	41,564	75	-	-	55,292
1969	328	10,929	19	3,346	6	41,957	75	-	-	56,232
1970	335	10,393	19	3,503	6	41,384	75	-	-	55,280
1971	346	9,792	18	3,510	7	40,401	75	-	-	53,703
1972	350	9,698	18	3,344	6	38,172	72	2,042	4%	53,256
1973	386	9,922	18	3,041	5	41,363	73	2,228	4	56,554
1974	404	9,203	16	2,779	5	43,124	75	2,582	4	57,688
1975[2/]	420	9,223	15	2,690	4	45,297	76	2,752	5	59,962

1/ Air Taxi included with General Aviation prior to 1972.
2/ Preliminary.

Source: FAA Air Traffic Activity, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 10

ITINERANT OPERATIONS AT FAA TOWERED AIRPORTS
(In thousands)

1960-1975

Year	Air Carrier Number	Air Carrier % of Total	Military Number	Military % of Total	General Aviation Number	General Aviation % of Total	Air Taxi[1/] Number	Air Taxi[1/] % of Total	Total Number
1960	7,164	40%	1,919	11%	8,909	49%	-	-	17,993
1961	6,980	38	1,834	10	9,418	52	-	-	18,232
1962	7,060	37	1,766	9	10,377	54	-	-	19,203
1963	7,340	35	1,739	8	11,636	56	-	-	20,715
1964	7,447	34	1,753	8	12,983	58	-	-	22,183
1965	7,819	32	1,686	7	14,707	61	-	-	24,212
1966	8,206	29	1,578	6	17,985	65	-	-	27,770
1967	9,360	31	1,525	5	19,632	64	-	-	30,517
1968	10,377	31	1,548	4	22,048	65	-	-	33,973
1969	10,929	31	1,515	4	22,486	64	-	-	34,930
1970	10,393	30	1,540	4	22,362	65	-	-	34,296
1971	9,792	29	1,486	4	22,094	66	-	-	33,372
1972	9,698	29	1,488	4	20,317	61	2,042	6%	33,545
1973	9,922	28	1,416	4	22,060	62	2,228	6	35,626
1974	9,203	25	1,302	4	23,776	64	2,582	7	36,863
1975[2/]	9,224	24	1,285	3	24,780	65	2,752	7	38,041

1/ Air Taxi included with General Aviation prior to 1972.
2/ Preliminary.

Source: FAA Air Traffic Activity, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 11

LOCAL OPERATIONS AT FAA TOWERED AIRPORTS
(In thousands)

1960-1975

Year	Military Number	Military % of Total	General Aviation Number	General Aviation % of Total	Total Number
1960	1,864	24%	5,917	76%	7,781
1961	1,959	24	6,110	76	8,069
1962	2,007	22	6,991	78	8,998
1963	1,978	19	8,284	81	10,262
1964	1,975	16	10,037	84	12,012
1965	1,792	13	11,866	87	13,658
1966	1,723	10	15,460	90	17,183
1967	1,779	9	17,590	91	19,369
1968	1,803	8	19,516	92	21,319
1969	1,831	9	19,471	91	21,302
1970	1,963	9	19,022	91	20,985
1971	2,024	10	18,307	90	20,331
1972	1,855	9	17,855	91	19,710
1973	1,625	8	19,303	92	20,928
1974	1,477	7	19,348	93	20,825
1975 1/	1,405	6	20,517	94	21,921

1/ Preliminary.

Source: FAA Air Traffic Activity, (Selected Editions), U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

Table 12

INSTRUMENT OPERATIONS AT FAA TOWERED AIRPORTS
(In thousands)

1968-1975

Year[1]	Air Carrier Number	Air Carrier % of Total	Military Number	Military % of Total	General Aviation Number	General Aviation % of Total	Air Taxi[2] Number	Air Taxi[2] % of Total	Total Number
1968	9,236	58%	3,284	21%	3,250	21%	-	-	15,770
1969	9,969	58	3,210	19	3,900	23	-	-	17,079
1970	9,619	56	3,297	19	4,298	25	-	-	17,214
1971	9,426	52	3,661	20	5,174	28	-	-	18,261
1972	9,561	46	4,052	20	5,986	29	987	5%	20,586
1973	9,897	41	4,191	17	8,625	36	1,289	5	24,002
1974	9,374	37	4,039	16	9,929	40	1,674	7	25,016
1975[3]	9,353	35	3,795	14	11,643	43	1,994	7	26,784

1/ Data by category not available prior to 1968. Instrument Operations totalled 6,961 thousand in 1961 and 10,291 thousand in 1965.
2/ Air Taxi included with general aviation prior to 1972.
3/ Preliminary.

Source: FAA Air Traffic Activity, Calendar Year 1974, U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C.

APPENDIX B

Specific Airport Data

Regarding

General Aviation

Table 13

CUMULATIVE PERCENT DISTRIBUTION
OF AIR CARRIER OPERATIONS
BY RANK OF AIRPORT

1975

Airport Rank 1/	Number of Air Carrier Operations (In Thousands)	Percent of Total Air Carrier Operations	Cumulative Percent
1-10	2,994	32.5%	32.5%
11-20	1,452	15.8	48.3
21-30	931	10.1	58.4
31-40	669	7.2	65.6
41-50	537	5.8	71.4
51-60	386	4.2	75.6
61-70	296	3.2	78.8
71-80	258	2.8	81.6
81-90	211	2.3	83.9
91-100	184	2.0	85.9
101-110	161	1.7	87.9
111-120	141	1.5	89.1
121-130	130	1.4	90.5
131-140	117	1.3	91.8
141-150	103	1.1	92.9
151-420	655	7.1	100.0
Total 2/	9,223	100.0	-

1/ Airports ranked by number of air carrier operations.
2/ Details may not add to total due to rounding.

Source: FAA Office of Management Systems

Table 14

GROWTH IN OPERATIONS AT TOWERED AIRPORTS

Selected Years: 1960-1975

Operations at All Towered Airports 2/	Number of Operations (In Thousands)						Percent Change
	1960	1963	1966	1969	1972	1975	'75/'60
Total Operations	25,774	30,977	44,952	56,232	53,256	59,962	132.6%
General Aviation Operations	14,826	19,921	33,445	41,957	38,172	45,297	205.5
Air Carrier Operations	7,164	7,340	8,206	10,929	9,698	9,223	28.7
Air Taxi Operations	-	-	-	-	2,042	2,752	34.8 1/
Total G.A. and Air Taxi	14,826	19,921	33,445	41,957	40,214	48,049	224.1
Total Local Operations	7,781	10,262	17,183	21,302	19,710	21,921	181.7
G.A. Local	5,917	8,284	15,460	19,471	17,855	20,517	246.7
G.A. Itinerant	8,909	11,636	17,985	22,486	20,317	24,780	178.1
G.A. Itinerant & Air Taxi	8,909	11,636	17,985	22,486	22,359	27,532	209.0

Operations as % of Total Operations at All Towered Airports	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations	57.5%	64.3%	74.4%	74.6%	71.7%	75.5%
Air Carrier Operations	27.8	23.7	18.3	19.4	18.2	15.4
Air Taxi Operations	-	-	-	-	3.8	4.6
Total G.A. and Air Taxi	57.5	64.3	74.4	74.6	75.5	80.1
Local Operations	30.2	33.1	38.2	37.9	37.0	36.6
G.A. Local	23.0	26.7	34.4	34.6	33.5	34.2
G.A. Itinerant	34.6	37.6	40.0	40.0	38.1	41.3
G.A. Itinerant & Air Taxi	34.6	37.6	40.0	40.0	42.0	45.9

1/ Percent change in air taxi for 1972 to 1975; air taxi included with general aviation prior to 1972.

2/ Data shown in this table represent operations at all FAA towers which increased from 229 in 1960 to 420 in 1975.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

Table 15

GROWTH IN OPERATIONS AT AIRPORTS RANKED 1-20
IN AIR CARRIER OPERATIONS IN 1975
Selected Years: 1960-1975

Operations at Airports Ranked 1-20 2/	Number of Operations (In Thousands)						Percent Change '75/'60
	1960	1963	1966	1969	1972	1975	
Total Operations	4,493	4,700	6,197	7,151	6,724	6,341	41.1%
General Aviation Operations	1,490	1,507	2,307	2,018	1,338	1,174	-21.2
Air Carrier Operations	2,704	2,967	3,727	5,009	4,797	4,446	64.4
Air Taxi Operations	-	-	-	-	479	662	38.2 1/
Total G.A. and Air Taxi	1,490	1,507	2,307	2,018	1,817	1,836	23.2
Total Local Operations	486	421	546	348	182	106	-78.2
G.A. Local	398	343	505	313	167	101	-74.6
G.A. Itinerant	1,092	1,164	1,801	1,705	1,172	1,073	- 1.7
G.A. Itinerant & Air Taxi	1,092	1,164	1,801	1,705	1,651	1,735	58.9

Operations as % of Total Operations at Airports Ranked 1-20	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations	33.2%	32.1%	37.2%	28.2%	19.9%	18.5%
Air Carrier Operations	60.2	63.1	60.1	70.0	71.3	70.1
Air Taxi Operations	-	-	-	-	7.1	10.4
Total G.A. and Air Taxi	33.2	32.1	37.2	28.2	27.0	28.9
Local Operations	10.8	9.0	8.8	4.9	2.7	1.7
G.A. Local	8.8	7.3	8.1	4.4	2.5	1.6
G.A. Itinerant	24.3	24.8	29.1	23.8	17.4	16.9
G.A. Itinerant & Air Taxi	24.3	24.8	29.1	23.8	24.6	27.4

1/ Percent change in air taxi for 1972 to 1975; air taxi included with general aviation prior to 1972.

2/ Dallas-Ft. Worth Regional Airport was commissioned in 1974. Prior to this date, data for Dallas Love Field was used in calculating activity levels. Similarly, Houston International was commissioned in 1969 prior to this time data for Houston Hobby was used.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

Table 16

GROWTH IN OPERATIONS AT AIRPORTS RANKED 71-90[1/]
IN AIR CARRIER OPERATIONS IN 1975
Selected Years: 1960-1975

Operations at Airports Ranked 71-90	Number of Operations (In Thousands) 1960	1963	1966	1969	1972	1975	Percent Change '75/'60
Total Operations	1,998	1,976	2,576	3,153	2,780	2,998	50.0%
General Aviation Operations	1,193	1,206	1,849	2,297	1,933	2,216	85.8
Air Carrier Operations	376	386	401	541	442	398	5.9
Air Taxi Operations	-	-	-	-	101	149	47.5[2/]
Total G.A. and Air Taxi	1,193	1,206	1,849	2,297	2,034	2,366	98.3
Total Local Operations	682	651	930	1,127	983	1,066	56.3
G.A. Local	475	440	785	982	833	950	100.0
G.A. Itinerant	718	766	1,064	1,314	1,100	1,266	76.3
G.A. Itinerant & Air Taxi	718	766	1,064	1,314	1,201	1,415	97.1

Operations as % of Total Operations at Airports Ranked 71-90	Percent of Total Operations 1960	1963	1966	1969	1972	1975
General Aviation Operations	59.7%	61.0%	71.8%	72.8%	69.5%	73.9%
Air Carrier Operations	18.8	19.5	15.6	17.2	15.9	13.3
Air Taxi Operations	-	-	-	-	3.6	5.0
Total G.A. and Air Taxi	59.7	61.0	71.8	72.8	73.2	78.9
Local Operations	34.1	32.9	36.1	35.7	35.4	35.6
G.A. Local	23.8	22.3	30.5	31.1	30.0	31.7
G.A. Itinerant	35.9	38.8	41.3	41.7	39.6	42.2
G.A. Itinerant & Air Taxi	35.9	38.8	41.3	41.7	43.2	47.2

1/ Excludes three airports which were ranked in this category in 1975 but for which data were not consistently available during the 1960-1975 period.
2/ Percent change in air taxi for 1972 to 1975; air taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

Table 17

GROWTH IN OPERATIONS AT AIRPORTS RANKED 131-150[1/]
IN AIR CARRIER OPERATIONS IN 1975
Selected Years: 1960-1975

Operations at Airports Ranked 131-150	Number of Operations (In Thousands)						Percent Change '75/'60
	1960	1963	1966	1969	1972	1975	
Total Operations	929	1,119	1,478	1,797	1,500	1,579	70.0%
General Aviation Operations	592	687	1,151	1,442	1,155	1,266	113.8
Air Carrier Operations	162	172	175	204	154	145	-10.5
Air Taxi Operations	-	-	-	-	31	29	- 6.4[2/]
Total G.A. and Air Taxi	592	687	1,151	1,442	1,186	1,295	118.8
Total Local Operations	361	462	654	802	628	639	77.0
G.A. Local	246	297	556	703	521	547	122.4
G.A. Itinerant	346	390	594	739	634	719	107.8
G.A. Itinerant & Air Taxi	346	390	594	739	665	748	116.2

Operations as % of Total Operations at Airports Ranked 131-150	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations	63.7%	61.4%	77.9%	80.2%	77.0%	80.2%
Air Carrier Operations	17.4	15.4	11.8	11.4	10.3	9.2
Air Taxi Operations	-	-	-	-	2.1	1.8
Total G.A. and Air Taxi	63.7	61.4	77.9	80.2	79.1	82.0
Local Operations	38.9	41.3	44.2	44.6	41.9	40.5
G.A. Local	26.5	26.5	37.6	39.1	34.7	34.6
G.A. Itinerant	37.2	34.8	40.2	41.1	42.3	45.5
G.A. Itinerant & Air Taxi	37.2	34.8	40.2	41.1	44.3	47.4

1/ Excludes seven airports which were ranked in this category in 1975 but for which data were not consistently available during the 1960-1975 period.

2/ Percent change in air taxi for 1972 to 1975; air taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

TABLE 18A
GROWTH IN OPERATIONS AT SELECTED AIRPORTS: 1/
CATEGORY 1

SELECTED YEARS: 1960-1975

Operations at Selected Airports	Number of Operations (In Thousands) 1960	1963	1966	1969	1972	1975	Percent Change '75/'60
Total Operations							
Los Angeles, Ca.	289	359	415	614	485	456	57.8%
Miami, Fla.	321	282	424	407	347	285	-11.2
Dallas, Tx. 2/	(257	248	320	423	405	342)	-
General Aviation Operations							
Los Angeles, Ca.	51	58	83	161	56	54	5.9
Miami, Fla.	135	126	232	130	78	50	-63.0
Dallas, Tx.	(105	109	124	145	107	16)	-
Air Carrier Operations							
Los Angeles, Ca.	216	286	321	443	372	340	57.4
Miami, Fla.	167	149	186	275	240	210	25.7
Dallas, Tx.	(146	134	191	275	264	282)	-
Air Taxi Operations 3/							
Los Angeles, Ca.	-	-	-	-	50	58	16.0
Miami, Fla.	-	-	-	-	28	25	-10.7
Dallas, Tx.	(-	-	-	-	30	44)	-
Total G.A. and Air Taxi							
Los Angeles, Ca.	51	58	83	161	106	112	120.0
Miami, Fla.	135	126	232	130	106	75	-44.4
Dallas, Tx.	(105	109	124	145	137	60)	-
General Aviation Local							
Los Angeles, Ca.	18	34	9	13	6	9	-50.0
Miami, Fla.	96	81	169	37	2	0	-100.0
Dallas, Tx.	(9	6	3	3	2	0.2)	-

1/ Airports selected: Los Angeles International, Los Angeles, Ca.; Miami International, Miami, Fla.; Dallas Love Field, Dallas-Ft. Worth Regional, Dallas/Ft. Worth, Tx.

Category 1 indicates airports were selected from a group of airports ranked 1 to 20 by 1975 air carrier operations.

2/ Operations data from 1960 to 1972 are operations at Dallas Love Field; operations data for 1975 from Dallas-Ft. Worth Regional Airport.

3/ Air taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

TABLE 18B
PERCENT DISTRIBUTION OF
OPERATIONS AT SELECTED AIRPORTS: 1/
CATEGORY 1

SELECTED YEARS: 1960-1975

Operations As % of Total Operations at Selected Airports	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations						
Los Angeles, Ca.	17.6%	16.2%	20.0%	26.2%	11.5	11.8
Miami, Fla.	42.0	44.7	54.7	31.9	22.5	17.5
Dallas, Tx. 2/	40.9	44.0	38.8	34.3	26.4	4.7
Air Carrier Operations						
Los Angeles, Ca.	74.7	80.0	77.3	72.1	76.7	74.6
Miami, Fla.	52.0	52.8	43.9	67.6	69.2	73.7
Dallas, Tx.	56.8	54.0	59.7	65.0	65.2	82.5
Air Taxi Operations 3/						
Los Angeles, Ca.	-	-	-	-	10.3	12.7
Miami, Fla.	-	-	-	-	8.1	8.8
Dallas, Tx.	-	-	-	-	7.4	12.9
Total G.A. and Air Taxi						
Los Angeles, Ca.	17.6	16.2	20.0	26.2	21.9	24.6
Miami, Fla.	42.0	44.7	54.7	31.9	30.5	26.3
Dallas, Tx.	40.9	44.0	38.8	34.3	33.8	17.5
General Aviation Local						
Los Angeles, Ca.	6.2	9.5	2.2	2.1	1.2	2.0
Miami, Fla.	29.9	28.7	39.9	9.1	0.6	0
Dallas, Tx.	3.5	2.4	0.9	0.7	0.5	0.1

1/ Airports selected: Los Angeles International, Los Angeles, Ca.; Miami International, Miami Fla.; Dallas Love Field, Dallas-Ft. Worth Regional, Dallas/Ft. Worth, Tx.

Category 1 indicates airports were selected from a group of airports ranked 1 to 20 by 1975 air carrier operations.

2/ Operations data from 1960 to 1972 are operations at Dallas Love Field; operations data for 1975 from Dallas/Ft. Worth Regional Airport.

3/ Air taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

TABLE 19A
GROWTH IN OPERATIONS AT SELECTED AIRPORTS: 1/
CATEGORY 2
SELECTED YEARS: 1960-1975

Operations at Selected Airports	Number of Operations (In Thousands) 1960	1963	1966	1969	1972	1975	Percent Change '75/'60
Total Operations							
Greensboro, N.C.	116	104	122	162	121	146	25.9%
Santa Ana, Ca.	165	227	347	545	571	619	275.2
Wichita, Ka.	181	191	274	250	180	228	26.0
Richmond, Va.	160	167	160	205	189	168	5.0
General Aviation Operations							
Greensboro, N.C.	81	71	96	129	85	112	38.3
Santa Ana, Ca.	157	213	336	526	534	579	269.0
Wichita, Ka.	153	160	247	203	141	188	22.9
Richmond, Va.	53	65	85	128	100	94	77.4
Air Carrier Operations							
Greensboro, N.C.	28	30	25	31	32	27	-3.6
Santa Ana, Ca.	6	6	10	18	23	27	350.0
Wichita, Ka.	22	23	23	42	26	26	18.2
Richmond, Va.	25	29	26	29	29	25	0
Air Taxi Operations 2/							
Greensboro, N.C.	-	-	-	-	1	2	100
Santa Ana, Ca.	-	-	-	-	13	12	-7.7
Wichita, Ka.	-	-	-	-	11	12	9.1
Richmond, Va.	-	-	-	-	8	12	50
Total G.A. and Air Taxi							
Greensboro, N.C.	81	71	96	129	86	114	40.7
Santa Ana, Ca.	157	213	336	526	547	591	276.4
Wichita, Ka.	153	160	247	203	152	200	30.7
Richmond, Va.	53	65	85	128	108	106	100
General Aviation Local							
Greensboro, N.C.	43	25	38	50	24	36	-16.3
Santa Ana, Ca.	71	100	200	309	303	314	342.2
Wichita, Ka.	49	55	92	55	39	58	18.4
Richmond, Va.	20	24	34	40	32	21	5.0

1/ Airports selected: Greensboro/High Point, N.C.; Orange County Airport, Santa Ana, Ca.; Wichita Mid-Continent, Wichita, Ka.; Byrd International Airport, Richmond, Va. Category 2 indicates airports were selected from a group of airports ranked 71 to 90 by 1975 air carrier operations.

2/ Air Taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington D.C.

TABLE 19B
PERCENT DISTRIBUTION OF OPERATIONS
AT SELECTED AIRPORTS: 1/
CATEGORY 2
SELECTED YEARS: 1960-1975

Operations as % of Total Operations at Selected Airports	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations						
Greensboro, N.C.	69.8%	68.3%	78.7%	79.6%	70.2%	76.7%
Santa Ana, Ca.	95.2	93.8	96.8	96.5	93.5	93.5
Wichita, Ka.	84.5	83.8	90.1	81.2	78.3	82.5
Richmond, Va.	33.1	38.9	53.1	62.4	52.9	55.9
Air Carrier Operations						
Greensboro, N.C.	24.1	28.8	20.5	19.1	26.4	18.5
Santa Ana, Ca.	3.6	2.6	2.9	3.3	4.0	4.4
Wichita, Ka.	12.2	12.0	8.4	16.8	14.4	11.4
Richmond, Va.	15.6	17.4	16.3	14.1	15.3	14.9
Air Taxi Operations 2/						
Greensboro, N.C.	-	-	-	-	0.8	1.4
Santa Ana, Ca.	-	-	-	-	2.3	1.9
Wichita, Ka.	-	-	-	-	6.1	5.3
Richmond, Va.	-	-	-	-	4.2	7.1
Total G.A. and Air Taxi						
Greensboro, N.C.	69.8	68.3	78.7	79.6	71.1	78.1
Santa Ana, Ca.	95.2	93.8	96.8	96.5	95.8	95.5
Wichita, Ka.	84.5	83.8	90.1	81.2	84.4	87.7
Richmond, Va.	33.1	38.9	53.1	62.4	57.1	63.1
General Aviation Local						
Greensboro, N.C.	37.1	24.0	31.1	30.9	19.8	24.6
Santa Ana, Ca.	43.0	44.1	57.6	56.7	53.1	50.7
Wichita, Ka.	27.1	28.8	33.6	22.0	21.7	25.4
Richmond, Va.	12.5	14.4	21.2	19.5	16.9	12.5

1/ Airports selected: Greensboro/High Point, N.C.; Orange County Airport, Santa Ana, Ca.; Wichita Mid-Continent, Wichita, Ka.; Byrd International Airport, Richmond, Va. Category 2 indicates airports were selected from a group of airports ranked 71 to 90 by 1975 air carrier operations.

2/ Air Taxi included with general aviation prior to 1972.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

TABLE 20A
GROWTH IN OPERATIONS AT SELECTED AIRPORTS: 1/
CATEGORY 3
SELECTED YEARS: 1960-1975

Operations at Selected Airports	Number of Operations (In Thousands) 1960	1963	1966	1969	1972	1975	Percent Change '75/'60
Total Operations							
Wilmington, N.C.	79	96	99	112	111	95	20.3%
Winston-Salem, N.C.	126	129	124	173	98	91	-27.8
General Aviation Operations							
Wilmington, N.C.	33	33	48	52	68	64	93.9
Winston-Salem, N.C.	103	115	111	160	84	81	-21.4
Air Carrier Operations							
Wilmington, N.C.	7	8	11	15	10	11	57.1
Winston-Salem, N.C.	21	13	13	12	12	10	-52.4
Air Taxi Operations							
Wilmington, N.C.	-	-	-	-	2/	2/	
Winston-Salem, N.C.	-	-	-	-	2/	2/	
Total G.A. and Air Taxi							
Wilmington, N.C.	33	33	48	52	68	64	93.9
Winston-Salem, N.C.	103	115	111	160	84	81	-21.4
General Aviation Local							
Wilmington, N.C.	19	18	23	21	27	25	31.6
Winston-Salem, N.C.	51	64	59	82	33	32	-37.3

1/ Airports selected: New Hanover Co., Wilmington, N.C.; Smith-Reynolds, Winston-Salem, N.C.
Category 3 indicates airports were selected from a group of airports ranked 131 to 150 by 1975 air carrier operations.

2/ Less than 100 operations.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, D.C.

TABLE 20B
PERCENT DISTRIBUTION OF
OPERATIONS AT SELECTED AIRPORTS: 1/
CATEGORY 3

SELECTED YEARS: 1960-1975

Operations As % of Total Operations at Selected Airports	Percent of Total Operations					
	1960	1963	1966	1969	1972	1975
General Aviation Operations						
Wilmington, N.C.	41.8%	34.4	48.5	46.4	61.3	67.4
Winston-Salem, N.C.	81.7	89.1	89.5	92.5	85.7	89.0
Air Carrier Operations						
Wilmington, N.C.	8.9	8.3	11.1	13.4	9.0	11.6
Winston-Salem, N.C.	16.7	10.1	10.5	6.9	12.2	11.0
Air Taxi Operations						
Wilmington, N.C.	-	-	-	-	2/	2/
Winston-Salem, N.C.	-	-	-	-	2/	2/
Total G.A. and Air Taxi						
Wilmington, N.C.	41.8	34.4	48.5	46.4	61.3	67.4
Winston-Salem, N.C.	81.7	89.1	39.5	92.5	85.7	89.0
General Aviation Local						
Wilmington, N.C.	24.1	18.8	23.2	18.8	24.3	26.3
Winston-Salem, N.C.	40.5	49.6	47.6	47.4	33.7	35.2

1/ Airports selected: New Hanover Co., Wilmington, N.C.; Smith-Reynolds, Winston-Salem, N.C. Category 3 indicates airports were selected from a group of airports ranked 131 to 150 by 1975 air carrier operations.

2/ Less than 1 percent.

Source: FAA Air Traffic Activity, U.S. Department of Transportation, Federal Aviation Administration, Office of Management System, Washington, D.C.

Table 21

CHARACTERISTICS OF SELECTED AIRPORTS

1974-1975

Airport	Number of Based Aircraft	Number of Fixed-Base Operators	Landing Fee (Yes or No)	Fuel Avail-ability (Yes or No)	Terminal Control Area (TCA)	Distance to Nearest City (miles)	1974 SMSA Population (000)
Los Angeles Int'l.	25	2	No	Yes	Group I	17	6,926
Dallas-Ft. Worth Regional	0	0	Yes	Yes	Group I	17	2,499
Miami International	58	6	Yes	Yes	Group I	5	1,416
Greensboro/High Point, N.C.	83	3	No	Yes	-	5	760
Orange Co., Santa Ana, Ca.	800	20	No	Yes	-	5	1,661
Wichita Mid-Continent, Wichita, Kansas	269	6	No	Yes	-	6	379
Byrd, Richmond, Va.	89	3	No	Yes	-	7	576
New Hanover Co., Wilmington, N.C.	56	2	No	Yes	-	4	127
Smith-Reynolds, Winston-Salem, N.C.	168	1	No	Yes	-	5	760

Source: Office of Airports Service, U.S. Census Bureau, Statistical Abstracts.

APPENDIX C

Rank Order of

Airports

Grouped by 1975

Air Carrier Operations

Table 22

AIRPORTS RANKED 1-20 IN AIR CARRIER OPERATIONS

1975

Rank	Airport	Rank	Airport
1	Chicago O'Hare Int'l. Chicago, IL	11	Washington National Washington, DC
2	Atlanta International Atlanta, GA	12	St. Louis International St. Louis, MO
3	Los Angeles Int'l. Los Angeles, CA	13	Pittsburgh Greater Int'l. Pittsburgh, PA
4	John F. Kennedy Int'l. New York, NY	14	Detroit Metro. Wayne County Detroit, MI
5	Dallas-Ft. Worth Regional Dallas, TX	15	Philadelphia Int'l. Philadelphia, PA
6	San Francisco Int'l. San Francisco, CA	16	Minneapolis-St. Paul Int'l. Minneapolis, MN
7	La Guardia New York, NY	17	Newark Newark, NJ
8	Miami International Miami, FL	18	Houston Intercontinental Houston, TX
9	Boston, Logan Boston, MA	19	Cleveland Hopkins Int'l. Cleveland, OH
10	Denver Stapleton Int'l. Denver, CO	20	Seattle-Tacoma Int'l. Seattle, WA

Table 23

AIRPORTS RANKED 71-90 IN AIR CARRIER OPERATIONS

1975

Rank	Airport	Rank	Airport
71	El Paso International El Paso, TX	81	Lihue Lihue, HI
72	Albany County Albany, NY	82	Green Bay, Austin Straubel Green Bay, WI
73	Greensboro Regional Greensboro, NC	83	Providence Providence, RI
74	Orange County Santa Ana, CA	84	Grand Rapids Kent Co. Grand Rapids, MI
75	Wichita Mid-Continent Wichita, KS	85	Reno International Reno, NV
76	Little Rock, Adams Field Little Rock, AR	86	Bristol Tri-City Bristol, TN
77	Jackson Municipal Airport Jackson, MS	87	Hilo, General Lyman Field Hilo, HI
78	Richmond Byrd Int'l. Richmond, VA	88	Mobile, Bates Field Mobile, AL
79	Madison Truax Madison, WI	89	Charleston AFB/Municipal Charleston, SC
80	Sioux Falls, Foss Field Sioux Falls, SD	90	Fairbanks Fairbanks, AK

Table 24

AIRPORTS RANKED 131-150 IN AIR CARRIER OPERATIONS

1975

Rank	Airport	Rank	Airport
131	Lincoln Municipal Lincoln, NE	141	Wilmington, New Hanover Co. Wilmington, NC
132	Baton Rouge, Ryan Field Baton Rouge, LA	142	Kalamazoo Kalamazoo, MI
133	Burlington International Burlington, VT	143	Springfield Springfield, MO
134	Nantucket Memorial Nantucket, MA	144	Casper Casper, WY
135	Waterloo Waterloo, IA	145	Fort Wayne Fort Wayne, IN
136	Middleton Middleton, PA	146	Newport News Newport News, VA
137	Huntington Tri-state Huntington, WV	147	Monroe Municipal Monroe, LA
138	Daytona Beach Daytona Beach, FL	148	Saginaw Tri-City Saginaw, MI
139	Evansville Evansville, IN	149	Winston-Salem, Smith-Reynolds Winston-Salem, NC
140	South Bend South Bend, IN	150	Bismarck Bismarck, ND

APPENDIX D

Impact of Changes in
Costs (Fuel and Maintenance)
on 1977 General Aviation
Flying Hours

TABLE 25

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 20 PERCENT FUEL & OIL COST INCREASE	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	7,057,319	- 5.8
PERSONAL	10,130,618	8,872,580	-12.4
EXECUTIVE	3,804,451	3,570,187	- 6.2
BUSINESS	8,127,763	7,484,472	- 7.9
AIR TAXI	1,948,223	1,766,863	- 9.3
COMMUTER	1,460,836	1,460,484	N.C.
RENTAL	2,702,216	2,381,821	-11.9
INDUSTRIAL	1,354,060	1,231,523	- 9.0
AERIAL	1,841,404	1,739,924	- 5.5
TOTAL	38,861,609	35,565,173	- 8.5

TABLE 26

1977 G.A. "PERSONAL" USE FLYING HOURS
BY TYPE OF AIRCRAFT

TYPE OF AIRCRAFT	FLYING HOURS, BASE CASE	FLYING HOURS WITH 20 PERCENT FUEL & OIL COST INCREASE	PERCENT CHANGE
SINGLE ENGINE PISTON (1-3 SEAT)	2,248,341	1,951,747	-13.2
SINGLE ENGINE PISTON (4 SEAT & OVER)	7,265,837	6,363,997	-12.4
TWIN ENGINE PISTON (UNDER 12,500 LBS.)	548,487	495,039	- 9.7
TWIN/MULTI-ENG. PISTON (OVER 12,500 LBS.)	5,501	5,161	- 6.2
TWIN ENGINE (TURBO PROP)	9,231	8,684	- 5.9
TWIN/MULTI-ENGINE (TURBOJET)	26,860	23,130	-13.9
ROTARY WING (PISTON & TURBINE)	26,361	24,822	- 5.8
TOTAL	10,130,618	8,872,580	-12.4

TABLE 27

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 20 PERCENT FUEL/OIL PLUS 20 PERCENT MAINT. COST INCREASES	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	6,878,059	- 8.2
PERSONAL	10,130,618	8,371,109	-17.4
EXECUTIVE	3,804,451	3,407,436	-10.4
BUSINESS	8,127,763	7,154,233	-12.0
AIR TAXI	1,948,223	1,647,608	-15.4
COMMUTER	1,460,836	1,460,896	N.C.
RENTAL	2,702,216	2,254,703	-16.6
INDUSTRIAL	1,354,060	1,169,474	-13.6
AERIAL	1,841,404	1,693,922	- 8.0
TOTAL	38,861,609	34,037,440	-12.4

TABLE 28

1977 G.A. FLYING HOURS BY CATEGORY OF USE

USE CATEGORY	FLYING HOURS, BASE CASE	FLYING HOURS, WITH 5 PERCENT DECREASE IN COSTS	PERCENT CHANGE
INSTRUCTIONAL	7,492,038	7,678,676	+ 2.5
PERSONAL	10,130,618	10,637,167	+ 5.0
EXECUTIVE	3,804,451	3,929,808	+ 3.3
BUSINESS	8,127,763	8,406,143	+ 3.4
AIR TAXI	1,948,223	2,045,635	+ 5.0
COMMUTER	1,460,836	1,460,836	N.C.
RENTAL	2,702,216	2,837,328	+ 5.0
INDUSTRIAL	1,354,060	1,411,284	+ 4.2
AERIAL	1,841,404	1,885,884	+ 2.4
TOTAL	38,861,609	40,292,761	+ 3.7