

design in terms of range at maximum payload, maximum landing weight, and the relationship between aircraft volume and payload. This last item is important because air cargo operators do not want to fly a lot of aircraft weight to accommodate empty space, but they also want to be able to take full advantage of the gross weight capability of the aircraft. A study of air cargo densities could support the balance of space and payload on future aircraft.

Air cargo is becoming a more important source of revenue for many combination carriers, and dedicated air cargo operators are integrating the services required to handle all of the shippers' transportation requirements for documents and commodities. There are some potential limits to the growth of air cargo, especially in international operations, but the industry is expected to outperform real growth in the economy during the next ten years.

REGIONAL AIRLINE INDUSTRY

Gerald W. Bernstein, SRI International

In 1984 approximately 26 million passengers, or almost 8 percent of all United States passengers, boarded regional airlines in the United States. Between 1985 and 1995 growth rates of approximately 8 percent per year should raise total air traffic volume in turboprop aircraft to 55 million passengers or 11 percent of the United States total. Several observations support an 8 percent growth figure:

- o Traffic growth will slow as routes replacing larger carriers no longer are available. Post-deregulation growth rates have averaged 14 percent per annum. In 1984 rates reached 20 percent.
- o New growth opportunities in intermediate service on infrequently serviced existing routes, new feed services (particularly to secondary hubs), and flights bypassing congested primary hubs will continue. Examples of this last include Mall Airways flights from Toronto to Hartford and Air Wisconsin's service from Bridgeport, Connecticut to Chicago.
- o Increasing integrations with larger airlines will provide a 4 percent to 5 percent growth rate through connecting or feed traffic.

Fewer Airline Operators

An important change will occur in the number of airline operators. At the start of 1985, 194 passenger airlines were operating. This number is expected to fall to 130 by early 1986, reflecting the continuing decline of the past several years. The rate of suspensions, consolidations, and mergers in 1984-1985 is the same as in past years, but the industry is seeing fewer new entrants. In the contiguous 48 states, the number of carriers may already have declined to fewer than 100. The total of 194 reflects Hawaiian and Caribbean carriers whose numbers have shown no significant

change and Alaskan carriers whose numbers have increased slightly. This trend toward a smaller number of operators will likely continue as a result of economic factors and as a response to the pressure on regional airlines to align with major air carriers. By 1995 the total number of regional airlines (in the contiguous 48 states) is expected to be many fewer than 100 -- perhaps 50.

Fleet Mix Changes

Fleet mix, or aircraft sizes, will also change. In 1984 aircraft with a seating capacity of 19 or fewer seats dominated the regional airline fleet with 1,331 aircraft, or 76 percent of the fleet. Only 416 aircraft with 20 or more seats were in service.

By 1995 the fleet will grow to between 2,200 and 2,800 aircraft, as illustrated in Figure 1. The exact growth will depend on whether the average aircraft seating capacity increases to 24 or 28 seats from the current 18. Conservative estimates of aircraft size increase suggest that the 1995 fleet will comprise almost 1,070 aircraft with 20 or more seats -- about twice the current number of aircraft that size. Stronger estimates place the number of aircraft with 20 or more seats at 1,276 -- three times the current figure.

The four remaining sections identify problems that airlines will need to overcome and opportunities that they can capitalize on to achieve the 1995 forecasts. Two issues dominate: the evolving relationship between regional and major airlines and the need to develop changes in financing practices.

Alignment with Major Airlines

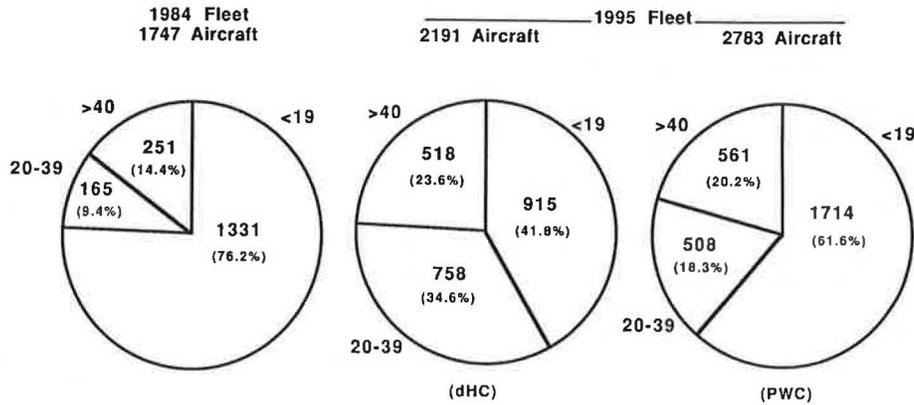
Attempts to identify the type or types of relationships desirable for and developing between regional and major airlines have generated much discussion. Each economic or financial benefit has an associated problem. This balance of benefits and problems precludes a consensus about what relationship will exist between the two types of airlines in the 1990s; according to one regional airline president, "the next worst thing to tying in with a major carrier is not tying in."

Some carriers that have allied themselves with the major airlines have found the relationship to be beneficial. Traffic increases of up to 40 percent are credited to the use of dual designators and interline agreements. Some regional carriers have received new aircraft; most have benefited from an image of improved stability and safety. Carriers have also received assistance in obtaining funding and assistance with gate and terminal space.

However, these benefits reflect the present "honeymoon" phase of the relationship. Dual designator status could lead to increasing control by the larger carrier as it seeks to consolidate its markets and improve its feed. The larger carrier may choose to dictate safety or operating standards, the routes that the regional airline can and cannot fly, and what equipment the airline will operate. If a regional airline is closely allied with a major carrier that experiences a strike, the regional airline would probably have to close shop for the duration. In other words, the pride of independence of the regional operator is lost.

Some kind of relationship will be unavoidable; once some regional airlines start affiliating, the others will not be able to resist, given the competitive advantages of association. The situation of regional airlines today is like that

Figure 1. Regional/commuter transport market (aircraft distribution by seat class).



Source: Pratt & Whitney Canada, Inc.; deHavilland Aircraft of Canada, Ltd.

of the corner grocery store that cannot compete with chain or affiliated supermarkets.

Relationships at either extreme, such as loose-knit affiliations or complete absorption, are unlikely. Too loose an affiliation will give the larger carrier insufficient control of its feed; complete absorption will generate maintenance, union, and management problems, all leading to higher costs that most major carriers will want to avoid. A happy medium may resemble Allegheny Commuter System's situation: schedule and equipment coordination with autonomous regional airline operators. But a ruthless major carrier, and some are more ruthless than others, could narrow the limits of autonomy to eliminate route experimentation or pricing flexibility. Such a development would be ironic; the regional airlines would be trading government regulation for economic regulation. If the regional airline does not play by the rules, the major carrier can support another regional carrier.

Not all markets lend themselves to dual designator dominance. This situation is not likely in markets in which the regional carrier competes with the major airlines, nor in a hub with no dominant major airline, such as Logan Airport in Boston.

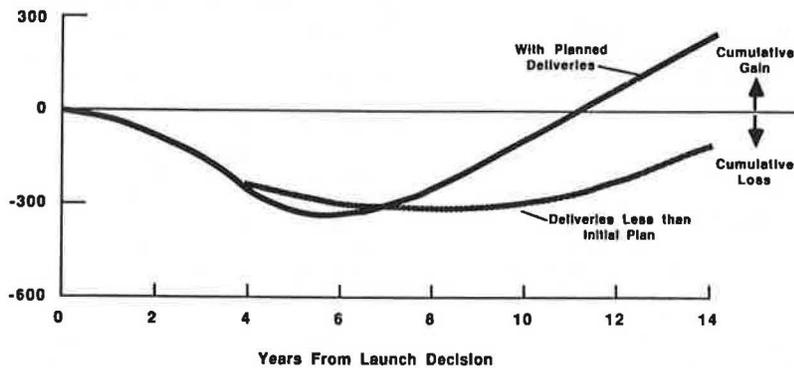
Changes in Financing Practices

Regional airline financing and capital formation are approaching the end of the second phase. The first phase occurred before, and for a short time after, airline deregulation. In that period commuter airlines were funded primarily through owner or nonpublic shareholder equity and equipment leasing, with some debt financing support from local banks.

The second phase began in late 1979 and manufacturers emerged as one of the leading sources of capital for the acquisition (purchase and leasing) of new aircraft. The second largest source was third-party leasing, which enables individual or corporate investors to make use of available tax benefits. Other sources of capital included banks and stockholder equity, the latter obtained by public offering or private placement.

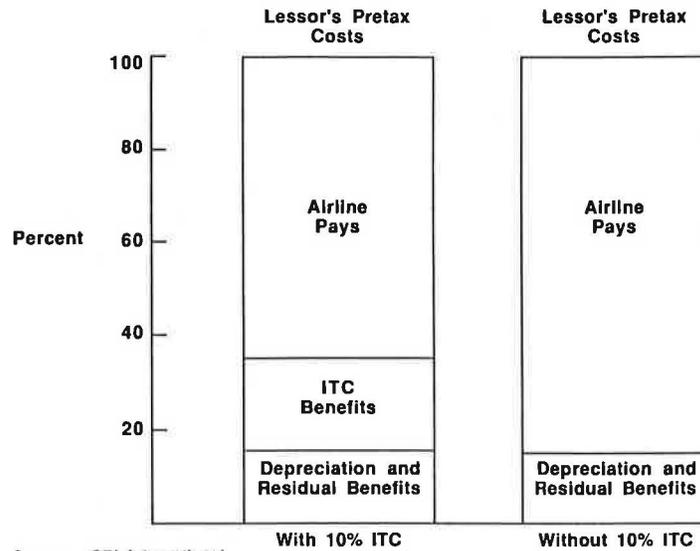
This phase is coming to an end because it is no longer viable. Manufacturers' ability to finance is diminishing as they begin delivering the new generation of aircraft. Figure 2 shows a typical manufacturer's cash flow for a 30- to 40-seat aircraft with a 1980 launch date and 1985 initial deliveries. At the present five-year point

Figure 2. Cumulative cash flow for a representative regional aircraft manufacturer (millions of dollars).



Source: SRI International

Figure 3. Sample increase in lease payments (typical ten-year aircraft lease).



in the development and production cycle, a manufacturer's ability to provide customer financing at this time is seriously reduced. Further, as healthier regional airlines seek capital from public stock offerings and banks, those airlines seeking manufacturer financing will likely be at higher risk and, thus, less likely to receive support. This combination of problems and the fact that manufacturer backlogs have improved for aircraft with 19 or fewer seats in the past six months (reaching two years for some models) suggest that manufacturers' ability and desire to finance sales will diminish.

Leasing without the investment tax credit (ITC) will become substantially costlier: a 30 percent increase in monthly rentals is expected. Figure 3 illustrates the reason for this cost increase. An airline now pays approximately 65 percent of the lessor's aircraft acquisition costs; the difference results from the pre-tax influence of the 10 percent (after tax) ITC (equivalent to a 20 percent up-front cash payment), depreciation, and residual benefits. Without the ITC the lessor receives no contribution from the ITC, and the airline must now provide the amount. Thus the airline would pay 85 percent of the lessor's acquisition cost, or a 30 percent increase. In addition, without the benefit of the ITC's up-front tax benefits, the lessor's risk increases, further reducing the attractiveness of this venture.

The next phase of aircraft financing may require greater participation by large regional commercial banks; the regional airlines can convince these banks to assume a value-of-asset orientation. Movement toward risk reduction mechanisms, such as residual value insurance, would benefit the industry as well. If these problems remain unresolved and ITC benefits are lost, growth in the regional airline industry and air service to many communities may be constrained.

Financial and Operational Issues

Traffic growth is the most positive trend in the regional airline business. Other future developments for regional airlines include the increased availability of new, fuel-efficient aircraft with

enhanced passenger appeal and an improving public image. However, numerous problems and obstacles to growth continue to plague the industry. The first of these problems is undercapitalization. Growth capital formation problems are more pervasive than the potential loss of investment tax benefits. Volatility of earnings and the relatively high cost of aircraft versus capital generation ability inhibit an airline's ability to develop a sufficient capital base for financing growth and operations.

Thin management talent also remains a problem. Larger regional airlines have developed sound business management practices, but many mid-size and small-size carriers continue to retain an aircraft orientation rather than a business orientation.

Access to all portions of the nation's air traffic system and facilities remains a critical requirement for regional airline success. Landing slots are essential for access to key airports; gate and terminal space and airspace to overfly crowded hubs through congested terminal control areas or control zones are essential to continued growth.

Although not a significant problem today, competition between regional carriers could develop in the years ahead. Regional carriers (affiliated with majors) will likely begin to compete for feed traffic as an extension of the competition between major airlines. Such competition could lead to lower yields and further exacerbate airline finances.

The proposed termination of essential air service (EAS) subsidies in 1988 does not seem to be a problem for the industry as a whole. A few individual carriers are highly dependent upon EAS subsidies, but these subsidies provide less than 5 percent of total industry revenue. The industry should survive EAS termination with no major setback. However, a greater problem is the resultant withdrawal of air service from as many as 150 rural communities. The government is continuing to subsidize urban travelers and rush-hour commuters, but residents of rural communities may lose valuable services.

Equipment Manufacturer Issues

Airframe manufacturers, like the airlines, face future opportunities and threats. Traffic growth in the United States provides a strong boost. The increased sophistication of larger airline operators reduces "handholding" requirements and reduces product support costs. Strong non-United States markets for corporate, utility, and military versions of commuter transports will provide further sales opportunities.

But before they can realize the potential of these opportunities, manufacturers must overcome a large number of serious problems, the greatest of which is production overcapacity. Manufacturers' collective production rate estimates are two to three times their own sales forecasts. This crowded sales situation will lead to inefficient production and severe sales competition, possibly forcing some manufacturers out of the regional airliner business. Manufacturers' decreasing ability to continue customer financial assistance is another problem; however, no one manufacturer wants to be the first to lose a prospective customer.

New aircraft sales in the United States are also constrained by the availability and price of used aircraft. With 8 percent growth forecast, this constraint may not seem to be a problem. The supply of used aircraft in the United States, however, appears to grow as used aircraft models are imported. The growing availability of used aircraft continues to prevent airframe manufacturers from fully realizing the benefits of strong growth in the number of passengers carried.

The regional industry can expect continuing strong growth and an evolution toward fewer, larger, better managed airlines. Some autonomy will likely be lost as affiliations develop with larger air carriers. Financial problems are likely to continue to trouble both the airlines and their key suppliers -- the aircraft manufacturers.

AIRCRAFT MANUFACTURING INDUSTRY

David Shube, Douglas Aircraft Company

With the demand for new commercial aircraft expected to approximate 4,000 units during the next ten years, the manufacturing industry has cause to be optimistic. But intense competition among the manufacturers coupled with growing demands from the airlines to restrict capital-related costs present the industry with an unprecedented challenge. The response to these compounding pressures is resulting in major changes in the way manufacturers will be doing business -- in the criteria and approach used to make decisions and in how they are implemented. Today's environment has made it imperative that extraordinary care be taken in evaluating the cost-effectiveness of each major decision and in how the ramifications of the resulting actions fit in with overall strategic objectives.

The discussion that follows presents the seminar's forecasts of traffic growth, aircraft retirements, load factors, and the associated demand for new aircraft. In subsequent section, the evolution of the current environment will be described, followed by the seminar's view of how the manufacturing industry is and will be responding to its new world.

Traffic Growth

Revenue passenger mile (RPM) annual growth is expected to average 5.3 percent during 1986 through 1995. Minimum and maximum deviations from the average were -1.6 percent and +1.0 percent respectively. At the average growth rate, RPMs will increase by more than two-thirds by 1995.

Aircraft Retirements

During the same period 2,273 commercial aircraft are expected to be retired. Considerable differences of opinion in this estimate were displayed: the lowest number proposed was 1,682 and the highest was 3,175.

Load Factors

The consensus view was that the average annual systemwide load factor would climb to 65.7 percent by 1995. The members of the seminar were in close agreement on this projection.

New Aircraft Deliveries

The expected deliveries of new aircraft needed during the period 1986-1995 to satisfy growth and to replace retired aircraft are shown in Figure 1. Four major categories of aircraft were forecast, classified primarily on the basis of range. However, in the short-range category it was determined that two size classes would be used. In addition to the group averages, the highest and the lowest forecasts in each category are tabulated.

Table 1. Commercial aircraft deliveries 1986-1995

	<u>Low</u>	<u>Average</u>	<u>High</u>
Short-range, fewer than 145 seats	787	1,101	1,438
Short-range, more than 145 seats	830	1,165	1,547
Medium-range	714	1,160	1,522
Long-range	380	556	832
		3,982	

Because the "low" and "high" entries are the extremes in each category, their sums do not represent the lowest and highest forecasts of total deliveries; these were 3,222 and 4,882, respectively, or approximately -20 percent and +21 percent from the average. For comparison, 3,321 aircraft were delivered in the ten years ending in 1985. Figure 1 shows historical and forecast annual average deliveries.

It is worthwhile to note that because the production capability of the aircraft manufacturing industry significantly exceeds the forecast demand of approximately 400 units per year, intense competition is expected to continue.

Manufacturers' Dilemma

It has become painfully apparent that the aircraft industry is facing a dilemma that manufacturers in other industries have been confronted with: increasing development costs producing diminishing