# Light Commercial and General Aviation
## *Growth Opportunities Will Abound*

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The new millennium offers numerous opportunities for light commercial and general aviation. The extent to which this diverse industry can take advantage of these opportunities depends on our ability to: (1) maintain steady, albeit slow, economic growth; (2) undertake research and development of new and enhanced technologies that improve performance and lower costs, (3) forge alliances and approach aircraft production from a total system perspective; and (4) develop and maintain an air traffic system (facilities and control) that is able to efficiently accommodate the expected growth in demand for all categories of air travel.

The greatest challenge for the industry is whether government policies and regulations continue to adhere to fiscal and monetary policies that promote economic growth worldwide and provide the necessary investments in our air traffic system to reduce congestion and avoid the distorting influences of user fees or artificial limits to access.

### HELICOPTER AVIATION

*Subcommittee A1J03 (1)*

The helicopter industry can be characterized as technologically mature but unstable in the structure of both its manufacturing and operating sectors. This anomaly is the result of worldwide reductions in military helicopter procurement after years of buildup as well as reduced tensions between the United States and the Soviet Union. In addition, and not unrelated to military cutbacks, the trend toward consolidation of military contractors has seriously affected the mostly subsidiary helicopter business. Caught up in this was the loss of McDonnell Douglas Helicopters as an independent entity. First it was merged into the Boeing organization and then it was partially acquired by a Dutch holding company. Additional changes in industry configuration have recently involved major sales and production agreements between Bell and Agusta, and between Agusta and GKN-Westland, and global teaming by Eurocopter and Sikorsky. Only the heavy helicopter segment has remained relatively untouched by mergers and acquisitions, and even there the existing American duopoly, facing an essentially monopsonistic U.S. military buyer, seems destined to consolidate. Another issue is that the worldwide manufacturing sector is dominated by just seven firms, a situation that by conventional measures of industrial concentration is just barely acceptable, and further consolidation might prove to be contentious. Only if the U.S. military were to insist on a strong, sole-source procurement base would a further shakeout of the heavy helicopter market be unopposed.

In the operator sector, which has always been unstable because of the undercapitalized and cyclical character of many small firms, a major restructuring took place at the end of the century when several offshore service carriers consolidated, forming the largest single helicopter operator with a fleet of 400 aircraft. The aeromedical market is facing similar consolidation. The growing market power of large operators should serve to counter parallel concentration among the original equipment manufacturers (OEMs).

Against this changing background has emerged the separation from conventional rotary-wing technology of the dual-mode tilt-rotor aircraft. The imminent availability of a certificated civil tilt-rotor marks the redirection of the industry along two divergent paths: mature conventional helicopters with a technological focus on cost-effectiveness, versus tilt-rotors (and related advanced rotary-wings), whose designers will stress range, speed, and versatility to increase system productivity, even by trading off higher cost. The first civil tilt-rotor is expected to be certificated in the United States in 2001. Similar research in Europe is now accelerating under the prompting of Eurocopter. Tilt-rotors are widely thought to present substantial opportunities for expanded capabilities in several missions now performed by conventional helicopters and other missions that now utilize fixed-wing turboprops.

The substantive changes in the organization of the rotorcraft industry and its new technological landscape make it necessary to consider the future of the industry in the context of the strategic alternatives that these changes will create.

The Helicopter Association International reports that 30 percent of the civil helicopter fleet and 60 percent of operator revenues are associated primarily with industrial support, which includes offshore transport for the oil industry and heavy lift operations such as logging. Next in importance is the parapublic market, primarily aeromedical services, which accounts for 45 percent of the fleet and 22 percent of operator revenues. In contrast, corporate or executive transport accounts for only 2 percent of the fleet and 4 percent of operator revenues. The handful of commercial carriers that are in operation worldwide are rolled into the 5 percent “other” category.

Thus, the primary markets today are for essential services that are unique to the helicopter and are, hence, price-inelastic. These markets have not grown significantly in size over the past few years, and there is little reason to believe they will flourish in the future. It is likely that the helicopter fleets devoted to oil and gas exploration, to logging and lifting, and to emergency medical service operations will be much the same size in 2025 as they are today, but these markets will remain viable for helicopter sales. Improvements in operating and acquisition costs and ever more reliable and extensive mission equipment will continue to reduce the opportunity costs of replacing old aircraft with new. The helicopter replacement market could well increase to a rate of 3 percent of the current fleet per year, compared with about 1.5 percent today.

At the same time, there will be a strong sales surge as tilt-rotor aircraft are adapted to those industry segments now using alternative modes. In particular, the combination of vertical takeoff and landing, with speeds and ranges usually associated with fixed-wing aircraft, will make the tilt-rotors particularly attractive to the corporate or executive market. Those same attributes will provide fixed-wing commuter operators with a broader array of metropolitan landing alternatives, with little or no loss in air trip time. Although the corporate segment remains relatively price-inelastic, the airline segment is not, so the economics of the tilt-rotor will have to improve. Needed cost improvements, however,

seem well within reason. Meanwhile, the alternative costs—to the passenger, if not to the airline—will continue to increase rapidly as airport access road and landside airport costs are further inflated by congestion.

The two-pronged rotorcraft technology thrust will further impact the structure of the manufacturing sector. The seven principal airframe manufacturers now employ about 40,000 people and generate annual revenues of about $8 billion. By 2025 the revenues should exceed inflation by a few percentage points, and the work force will likely be about 10 percent smaller. The number of global firms may diminish by one or even two, but the more likely scenario is survival of all the present players, but in different forms. Both military and civil helicopter programs will be organized in cross-industry teams, with OEMs holding various equity positions. Some joint ventures will be long-lasting, formal arrangements along the lines of the GKN-Agusta EH-101; many others will more closely resemble the construction industry, where companies that normally compete against each other join together for a single, short-term program and then revert to their basic businesses.

The military, in particular, will insist on teaming in any new helicopter projects. These projects will be few and far between in the United States, but a new procurement cycle in Europe will still be strong by 2025, and it is likely that U.S. companies will gain entry to the European teams at that time.

## BUSINESS AVIATION OUTLOOK

*Subcommittee A1J03 (2)*

Although business aviation has been in existence since the 1920s, aircraft designed and built for business users did not emerge until the late 1950s and early 1960s. Today, annual sales of new and used business aircraft exceed $10 billion. At present, approximately 9,500 business jets and 9,200 business turboprops are in service worldwide, compared with approximately 10,500 commercial jet transports and 7,200 regional turboprop and jet aircraft. Although sales, fleet growth, and utilization are all elements of the business aviation sector, the outlook for business aviation in the new millennium will mostly reflect market conditions for new business jets and turboprops. The market is heavily influenced by events in the United States, where domestic customers comprise approximately 70 percent of the world market for new deliveries.

Business jet deliveries have been through two major cycles since the early 1960s, including a historic high of 530 deliveries in 1981. The industry is now experiencing its third major expansion. In the near term (two to three years), deliveries of jets are expected to exceed the historic high, while new turboprop deliveries will follow a very slight upward trend. A slowdown is then expected.

Attitudes toward business aviation vary by world region and economic cycle. Yet, business aviation benefits from some substantial underlying trends. The appeal of business aviation continues to expand as the world’s economies and businesses become increasingly integrated, as business aviation’s own costs are reduced through new aircraft and new means of fleet management, and as commercial air travel becomes more a form of mass transportation. The diverse driving forces that have shaped business aviation demand can be grouped into three dimensions to provide a basis for assessing future direction:

- Corporate willingness and ability to purchase business aircraft;
- Government actions that influence the market; and
- Competitive alternatives to business aviation.

Corporate willingness and ability to purchase business aircraft vary across cultures. In North and South America, business aircraft are generally accepted; in Asia, adverse cultural attitudes in the larger economies presently mitigate against their use. In most regions, the strongest indicator of business aircraft demand is corporate profitability. Business aircraft sales rise and fall with corporate profitability, which is in turn tied to overall economic performance.

Government influence is pervasive and is realized in many different ways. Tax incentives (or lack thereof), high en-route and landing charges (such as in Europe and Asia) and infrastructure constraints (slot limitations) seriously affect business aviation activity.

Finally, competitive forces exert quite an influence. These influences can include internal industry influences, such as the stimulatory effect on sales of new aircraft programs, or cost-reducing alternatives, such as fractional (shared) ownership programs. Further external influences can include the cost and quality of airline service.

Looking forward, we see both opportunities and threats in these forces. Foremost among the opportunities are fractional ownership programs and the deteriorating quality of commercial airline service for business travelers (termed a “misery index” by one subcommittee member). The major threats foreseen are the risk of user fees and airport and airway congestion.

For the past 10 years, the traditional alternatives of corporate aircraft ownership or charter have been supplemented by a variety of fractional (shared) ownership and aircraft management programs. These programs have been developed to allow businesses and individuals the ability to obtain the convenience of a business aircraft for as little as one-sixteenth the capital investment required for full ownership. A high percentage of customers of these programs are first-time users of business aviation — initially reported to be 80 percent of program participants.

Fractional ownership has significantly strengthened the industry and the demand for new aircraft. These programs provide almost 20 percent of new jet deliveries (and a high percentage of order backlogs). A companion development has seen increasing numbers of business aircraft owners make their aircraft available for charter when not in company use, a procedure that helps defray some of the owners’ fixed costs. It is likely that the next two decades will see continued innovations aimed toward increasing utilization and reducing user costs for these airborne assets.

How far fractional ownership programs will expand is subject to much discussion at this time. Already, fractional programs are reporting that 70 percent (no longer 80 percent) of participants are new to business aviation. A certain amount of “cannibalization” of existing demand is beginning to occur. The saturation point (or the point at which new customer growth slows significantly) is unknown. Equally unknown is how these programs will fare through an economic downturn. Since these programs account for approximately 20 percent of recent orders and the present backlog, the growth of these businesses will strongly influence overall industry health.

Commercial airline service on U.S. domestic routes is currently reporting 70 percent plus load factors, a historically high level. Somewhat anomalous to rising load factors, fares

also have been rising steadily in the past several years. Combined, these influences tend to increase traveler aversion to commercial airline travel. When these adverse influences are combined with the benefits that business aviation provides for productivity, business aviation is seen as an increasingly attractive alternative. We expect this advantage will expand, although cyclically, due to changing airline load factors and fares.

As regards adverse influences, the greatest concern is with government actions that will have a negative effect on the market. Of these actions, a user fee is a recurring issue. There is discussion at present of privatizing the Federal Aviation Administration and of developing various new cost recovery procedures for users. The level, cost, and complexity of administration and the equity of allocation of such fees are all causes for concern at this time.

Finally, airport and airway congestion will have potentially adverse impacts if it is not ameliorated. Full use of aviation funds (such as those in the Airport Improvement Program) to support aviation developments is desired, but has mixed political support. The concern is that congestion will force users other than the commercial airlines away from desired routes and facilities, thereby reducing the attractiveness of business aviation and other noncommercial aviation system users.

The next two decades hold promise of a robust industry, but not a time without challenges!

## REGIONAL AVIATION

*Subcommittee A1J03 (3)*

The regional airline industry has evolved over the past 20 years from small operators of 19-seat and smaller piston and turboprop-powered aircraft into airlines that carry several millions of passengers annually and that operate aircraft seating up to 90 passengers. The growth of the commuter segment of the air passenger industry in the United States has been impressive; from 9 million passengers in 1977 (prior to deregulation), the industry now boards almost 70 million passengers annually. Today, these airlines account for approximately 10 percent of all domestic airline passenger enplanements in the United States. The industry's accompanying growth in size and sophistication caused its name to change from the commuter airline industry to the regional airline industry.

The manufacturers of regional aircraft face a number of challenges as the airlines they serve continue to evolve. The worldwide trend toward airline deregulation (or liberalization) has created new markets for 90-seat and smaller aircraft that can economically serve routes those large airlines cannot operate efficiently. At the same time, new aircraft, such as regional jets, enable more effective competition with these same large airlines. Simultaneously, markets served by the smaller regional aircraft are becoming uneconomic because of rising operating costs and the costs of regulatory compliance.

This subcommittee tends to focus on the issues facing the regional airline industry from the perspective of aircraft and equipment manufacturers. In the United States, we expect to see regional airlines continuing the expansion of their routes into markets previously unserved by regional operations; some of these will be longer-range routes from major affiliated airline hubs, and others will be on-line spokes for regional airlines operating through their own hubs. We see the new generation of smaller jets first introduced in the early 1990s enabling this evolution.

In Canada, this pattern will evolve by connecting smaller cities to numerous provincial capitals. Relatively small-capacity airplanes capable of operating economically will continue to be favored over long ranges, except on the major national routes. In addition, the open skies agreement between the United States and Canada (1995) has created a growth opportunity for airlines of both countries to provide point-to-point service without hubbing through "gateway" airports, a trend we expect to see increasingly exploited.

In Europe, deregulation (or more correctly, liberalization) also has developed steadily. At present, the regional airline industry in Europe operates free from direct government regulation of fares and frequency, although air carriers are subject to a more high-cost, capacity-constrained environment than is faced by North American regional airlines. Nonetheless, regional air passenger growth has occurred at high levels throughout the past decade.

In Europe, we expect that the continuing drive toward economically sound performance will continue to shift traffic from the larger air carriers to regional operators. Competition with alternative modes of transport (such as high-speed rail) will continue to force regional operators to identify service opportunities between cities without good ground connections. We anticipate European traffic growth will continue to be accommodated by increased aircraft capacity, rather than flight frequency, in recognition of the region's continued infrastructure capacity constraints and higher operating costs.

In other regions of the world, regional air travel is characterized as being both highly regulated and highly integrated. While the United States and Europe (and Canada, Australia and a few other countries) support market-based solutions to air travel demand, governments continue to regulate the aviation industry in many other regions of the world. Although movement toward more liberalized air service has gained momentum on a bilateral basis, these domestic air services continue to be tightly controlled.

Four key issues, which the subcommittee has repeatedly discussed, will affect the direction of the industry. These issues include the extent of jet replacement of turboprop aircraft, the possible demise of the 19-seat aircraft, the extent to which point-to-point service by smaller regional jets will erode the hub-and-spoke service of larger airlines, and the constraining effect that government regulations and infrastructure limitations are likely to have on the growth of regional airlines.

The shift to jets is currently the most significant trend within the industry. How far this shift will reach in the United States is dependent on the modification of pilot contract restrictions (known as scope clauses), which constrain the growth of the market for regional jets seating more than 70 passengers. When these contracts change over the next 20 years, the boundaries between the regional airlines and their larger partners will (again) be moved. The lower-cost regional airlines will be allowed to fly jets seating up to 90 or 100 passengers. Some concern is being expressed as to the ability of regional airlines to fund these larger (for them) aircraft, but this issue is not expected to present a real barrier. The industry overcame the same concerns in the early 1980s when airlines started moving into the (then) new 30-seat turboprops.

Turboprop aircraft deliveries will continue, but at significantly lower levels than during past decades. We anticipate the demand for turboprop aircraft seating 15 to 59 passengers to continue a decline that started around 1996. We anticipate that average aircraft size will grow as many of the routes now served by smaller turboprop aircraft are replaced by the jet aircraft on order and option.

We also expect the number of jet airplanes in the regional airline fleet to expand quite significantly. Within 10 to 20 years, we anticipate that the 50-seat jet will be the backbone of the regional airline fleet in North America. The strong passenger traffic growth we foresee is partly driven by the passenger appeal of these aircraft. Airlines that operate these aircraft report increases in both passenger load factors and average yields (fares) relative to turboprop models. While the 50-seat jet will be the most popular model, we expect all types—both larger and smaller—to share in the growth.

Parallel to this change will be the elimination of 19-seat aircraft from all but niche and developing nation markets. The regulatory burden of operating costs, combined with increasing customer expectations for jets, will all but eliminate these aircraft from major world markets.

As the smaller jets proliferate, the question arises whether they will operate in the same hub-and-spoke fashion of the larger jets, or whether they will provide point-to-point service (eroding the hub-and-spoke service of larger airlines). To date, most service has remained hub and spoke. We anticipate, however, that as congestion increases, and the entrepreneurial growth of regional airlines continues, these carriers will slowly increase point-to-point service that bypasses congested hubs.

This raises the fourth concern, which is the extent to which government regulations and infrastructure limitations are likely to constrain the growth potential of regional airlines. Airport congestion is expected to grow, and pressures are expected to continue to favor the larger air carriers and their higher-capacity aircraft. Nonetheless, we expect that demand for access to the national air transportation system by smaller communities will continue, that growth in average aircraft size will occur as more jets are introduced, and that increased utilization of airports with excess capacity will all enable the regional airline industry to post steady gains in its share of the nation’s air traffic over the next 20 years.