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Introduction

The 1999-2004 outlook for business aviation (here business aviation refers to turbine-powered, fixed-wing, general aviation aircraft) is strong if certain key conditions remain unchanged. First and foremost, it is important that the U.S. economy avoid a recession. For purposes of this discussion, the panel was comfortable retaining the assumption that the U.S. economy will soften slightly around 2001-2002, with real growth in gross domestic product falling within the range of 1.8 to 2.0 percent. Nonetheless, the forecast assumes that a recession will be avoided during the forecast period. In regard to other regions of the world, the panel believes that Asia, Europe, and South America will be modest "pluses" for the business aviation industry. Asia will continue efforts to correct monetary imbalances and implement fiscal policies to further stimulate growth, Western Europe will continue to benefit from economic integration and improved world competitiveness, and South America will constrain the distorting influences of inflation. All regions will benefit from more market-oriented policies that spur economic activity.

Second, the panel assumes that the regulatory environment affecting business aviation will not change dramatically over the next five years. Specifically, the panel's forecast assumes that there will be no attempt to constrain business aviation activity by imposing user fees or limiting access to airports and airspace. It is assumed that noise and emissions requirements on business turbine aircraft will remain within the bounds prescribed by current rules and regulations affecting the forecast period. And the panel assumes that the further development of fractional ownership will not be inhibited by more stringent certification requirements or unwarranted regulations constraining the use of aircraft operating under fractional ownership.

Third, the panel recognizes the influence of new product development on business aviation activity. In part, the robust conditions observed over 1998 and 1999 reflect the

unprecedented product development that occurred over the preceding five years and that resulted in the introduction of approximately 15 new and derivative business turbine aircraft. An almost equal number of new and derivative aircraft has been announced for the forecast period. The panel assumes that these product announcements will enter the market and live up to their billing in regard to price, performance, and availability.

Fourth, the panel assumes that fractional ownership will continue to grow and bring new operators into business aviation while providing current operators with efficient and effective ways to manage fleet resources. Current information on fractional ownership suggests that 60 to 70 percent of those purchasing a fractional share today do not currently own a business aircraft. The remaining portion of fractional buyers are operating business aircraft but wish to refine the composition of their current fleet so that they can better satisfy their demand for business travel.

In addition to these key assumptions, the panel assumes that 75 percent of new turbine production will enter the U.S. fleet. This capture rate is slightly higher than the historic rate, but the upward adjustment reflects the expected continued strength of the U.S. economy and the dominant role the U.S. fleet plays in the world fleet. The panel believes that 0.5 percent is an appropriate attrition rate for the business jet fleet and that a 1.0 percent attrition rate is applicable to the business turboprop fleet. The difference in the attrition rates reflects differences in fleet aging and net exports in used aircraft. On average, net exports (U.S. exports of used aircraft minus U.S. imports of used aircraft) of business jet aircraft are expected to balance out over the forecast period, with year-to-year variation reflecting the impact of economic conditions on the international flow of this dollar-denominated mobile asset. It should be noted that approximately 100 business jet aircraft will enter the U.S. fleet from the world fleet over 1999, a flow that the panel believes will reverse itself during the forecast period. As such, attrition from the U.S. jet

fleet will reflect retirements and writeoffs and average approximately 30 jet aircraft per year. In contrast, the panel believes that there will be a modest flow of business turboprop aircraft from the U.S. fleet to the world fleet over the forecast period. If this is added to the influence of retirements and writeoffs, it can be expected that approximately 60 business turboprop aircraft will leave the U.S. fleet annually. The panel also assumes that market conditions will support the continued delivery of 600 new jet units per year worldwide, on average. Given the maturity of the turboprop segment of business aviation, the panel assumes that annual worldwide deliveries of new turboprop aircraft will average 200 units, a number that includes some nonbusiness turboprop aircraft (e.g., the Cessna Caravan) picked up in fleet counts. As an aside, it should be noted that the introduction of new engine technologies could have a dramatic impact on the turboprop segment of business aviation after 2004. However, because this possibility is still speculative, the panel did not factor this into out-year assumptions about deliveries (e.g., deliveries in 2003 and 2004 could be delayed in anticipation of entrance of substantially new products into the market in 2005).

1999-2004 Forecast

The panel framed its discussion around a straightforward heuristic model of business aviation activity. By definition, the U.S. fleet in any year is the sum of new production flowing into the fleet, the fleet size carried over from the previous year, and attrition of existing aircraft during the current year. As noted above, attrition includes net exports, retirements (which includes units temporarily taken out of the active fleet), and writeoffs. New production depends on economic growth and corporate profitability, new product development and introduction, and new aircraft prices. Total fleet hours is influenced by a number of factors including the level of economic activity, operating costs, fleet size, and the composition of users (i.e., the proportion of aircraft under fractional ownership). The panel considered all of these factors in its discussion and incorporated their influences into its forecast numbers.

The panel believes that market conditions will sustain a delivery rate of approximately 600 new business jet units per year on average. Assuming that 75 percent of new production flows into the U.S. jet fleet, 450 new business jet aircraft will enter the U.S. jet fleet annually over the forecast period. Given the expected annual rate of turboprop production (200 units), it is also expected that 150 new turboprop aircraft will enter the U.S. turboprop fleet annually. At the same time, the existing jet fleet will shrink approximately 0.5 percent on average due primarily to retirements and writeoffs. For forecast purposes the panel sets attrition from the U.S. business jet fleet at 30 jet units per year. At the same time the turboprop fleet will shrink approximate-

ly 1.0 percent per year, i.e., 60 units per year. As noted above, the higher attrition from the turboprop fleet reflects a larger number of retirements due to fleet aging and a modest level anticipated for net exports. Of course, there will be year-to-year variation around these mean values reflecting the randomness associated with writeoffs and normal variation in exchange rates and other economic influences affecting the international flow of used aircraft.

With these projected inflows and outflows the panel expects the business jet fleet to grow by approximately 420 aircraft per year and the turboprop fleet to grow by approximately 90 aircraft per year over the forecast period. Of course, these linear increases reflect movement toward the mean, when in fact there will be year-to-year variation around these trend values because of year-to-year deviations from the panel's assumed conditions and the natural variability observed in the behavior of owners and operators of business turbine aircraft related to their own peculiar circumstances.

Given the estimated sizes of the 1999 jet and turboprop fleets, forecast fleet sizes for 2000 through 2004 are summarized in Table 1. Year-to-year details are provided in Table 2. Given the estimated size of the 1999 business jet fleet (5,770 aircraft) it is forecast that the U.S. business jet fleet will number 7,870 business aircraft (numbers have been rounded in calculations) by 2004. This increase in the business jet fleet corresponds to an average annual growth rate of 6.4 percent in the business jet fleet. This growth rate is significantly higher than recent historic growth rates and higher than that forecast just a few years ago looking forward to the year 2000. This upward adjustment is warranted, however, by changed industry conditions. The higher rate of growth in the business jet fleet reflects a significant increase in the perceived sustainable annual rate of production for business jet aircraft (increasing from approximately 350 to 400 units per year to 600 units per year) associated with the strong domestic economy, a shift from commercial air travel to business air travel by some groups, unprecedented development of new and derivative models that continues to increase the value (benefits over costs) of owning a business jet, and the impact of fractional ownership on the business turbine market. In combination, these influences have moved the business jet market to a new, sustainable level. Necessarily, the greater inflow of new jet aircraft into the jet fleet boosts fleet growth, and this is reflected in the panel's forecast numbers.

With a 1999 turboprop fleet of 5,780 aircraft, it is expected that the U.S. turboprop fleet will number 6,230 aircraft by the year 2004. This corresponds to an average annual growth rate of 1.4 percent, a value consistent with the maturity of this segment of the business aviation industry when the domestic economy is expected to display modest real growth. As noted above, it is possible that the growth in the turboprop fleet could show some softening in

2003 and 2004 as new purchases are delayed in response to the introduction of new models incorporating significant improvements in engine technology. The forecast numbers do not factor this in, however, because of the uncertainty about the timing of any introductions that may be linked to advances in engine technologies. Regardless, the panel believes that the business turboprop fleet will show modest growth over the forecast period.

Forecasts for total flight hours for the jet and turboprop fleets are summarized in Table 3. Given the assumptions about fundamental background conditions (e.g., growing national economies, a stable regulatory environment, and no significant changes in operating costs) total hours are driven by the forecast growth in fleet size and, in the case of business jets, the change in fleet composition toward fractional ownership. First, consider the operation of the turboprop fleet. Total turboprop hours is expected to increase from approximately 1.7 million in 1999 to slightly more than 1.8 million hours in 2004. This increase corresponds to an average annual growth rate in total fleet hours of 1.4 percent. The slightly lower growth in turboprop fleet hours compared with the growth in fleet size is consistent with the aging of the business turboprop fleet. Older aircraft have lower utilization rates less than newer aircraft. Overall, the panel expects the turboprop utilization rate (hours per aircraft) to average 190 to 195 hours over the forecast period, with the possibility that the impact of aging will be balanced by a general increase in the demand for business air travel associated with expanding economic activity.

In regard to business jet aircraft, the panel anticipates 1999 fleet hours to be approximately 2.1 million. This level of activity is slightly higher than some estimates of 1999 fleet hours, but the panel members believe previously reported estimates did not adequately reflect the influence of fractional ownership on aircraft utilization. For example, the typical business jet aircraft in a corporate fleet flies approximately 330 hours per year, whereas a jet aircraft operated under fractional ownership will fly approximately 1,200 hours per year. In 1999 there were approximately 250 business jet aircraft operating under fractional ownership. The panel adjusted previous estimates for this impact to derive the base year (1999) value of 2.1 million hours.

The number of aircraft operating under fractional ownership is expected to increase by approximately 80 aircraft per year over the forecast period. This means that there will be approximately 650 jet aircraft (8.0 percent of the business jet fleet) operating under fractional ownership by 2004. Because of the increasing presence of "fractional flying," the panel expects total fleet hours to increase at a rate exceeding the growth rate in the business jet fleet; that is, this shift in fleet composition will have a discernible impact

on total jet fleet hours. By the year 2004, total business jet fleet hours is forecast to reach 3.2 million, with nearly 25 percent of this total attributable to aircraft operating under fractional ownership. This total increase in total jet fleet hours corresponds to an average annual increase of 8.5 percent, a rate substantially higher than the growth rate in fleet size. With the shift toward fractional ownership and the more intense use of fractional jets this brings, the average jet utilization rate (hours per aircraft) is forecast to increase from the historic corporate utilization rate of 330 hours per year to approximately 400 hours per year.

Summary

Business aviation has experienced a resurgence over the past five years because (a) the results from research and development resulted in new and derivative products that increased value to the customer; (b) the commercial air travel industry did not figure out (and has not figured out) how to balance the efficiencies of a hub system with a customer focus on service and convenience; (c) a growing economy created the desire for and capacity to purchase business turbine aircraft; (d) new institutions improved the business case for acquiring business turbine aircraft, thereby bringing new operators into the industry; and (e) the regulatory environment avoided unwarranted constraints on the acquisition and operation of business turbine aircraft while enhancing the capacity and safety of the nation's airspace. Given the momentum in the business aviation market; persistent competitive pressures that ensure continued research and development by original equipment, avionics, and engine manufacturers; and reasonable assumptions about economic and regulatory trends over the next five years, it is expected that business aviation in the United States will continue showing considerable strength and solidify its role in the nation's air transportation system. The U.S. economy shows no sign of moving into a recession, and other national and regional economies around the world appear to be improving their economic performance. The unprecedented research and development that spurred growth over the latter part of the 1990s is expected to continue through the early years of the new millennium. If announced plans are achieved, the business aviation industry will have introduced approximately 30 new and derivative turbojet aircraft by the end of 2004. The safety record for business aviation continues to improve within the current regulatory environment, and this record should mitigate any arguments for further regulatory intrusion purporting to protect the businessperson operating business turbine aircraft. The competitive forces that created fractional ownership and added a substantial number of new owner-operators to the business aviation industry and

improved the efficiency of current fleet operations will continue to extend the benefits of business turbine aircraft into unserved and underserved markets.

Taken together, these factors support a robust forecast for business aviation. The business jet fleet is expected to grow at an average annual rate of 6.4 percent for the 1999-2004 period resulting in a jet fleet approaching 7,900 aircraft. Total jet hours is expected to grow at an average annual rate of 8.5 percent and will exceed 3.1 million hours

by 2004. Over the forecast period, the turboprop fleet will grow modestly, increasing at an average annual rate of 1.5 percent. Fleet hours will also expand, but at a slightly lower rate (1.4 percent) because of the effect of age on utilization. By the end of the forecast period turboprop hours will exceed 1.8 million. Overall, the forecasts for these measures of business flying speak to the increasing role that business aviation plays in maintaining our nation's competitiveness in a global economy.

TABLE 1. FIXED-WING TURBINE AIRCRAFT FLEET

Turbojets					
Actual			Forecast		
1990	1998	1999*	2000	2001	2004
4,100	5,468	5,770	6,190	6,610	7,870
Average Annual Growth Rate (Percent)					
	1990-99	1998-1999	1999-00	2000-01	1999-04
	3.9	5.5	7.3	6.8	6.4
Turboprops					
Actual			Forecast		
1990	1998	1999*	2000	2001	2004
5,300	5,700	5,780	5,870	5,960	6,230
Average Annual Growth Rate (Percent)					
	1990-99	1998-1999	1999-00	2000-01	1999-04
	1.0	1.4	1.6	1.5	1.5

* Increase in aircraft for 1998-1999 reflects the increase of fractional ownership on aircraft utilization.

TABLE 2 TURBINE FORECAST DETAIL**FIXED-WING TURBINE AIRCRAFT FLEET**

Turbojet Fleet					
1999*	2000	2001	2002	2003	2004
5,770	6,190	6,610	7,030	7,450	7,870
Turboprop Fleet					
1999*	2000	2001	2002	2003	2004
5,780	5,870	5,960	6,050	6,140	6,230

FIXED-WING TURBINE AIRCRAFT HOURS FLOWN

Turbojet Hours (000s)					
1999*	2000	2001	2002	2003	2004
2,100	2,320	2,540	2,750	2,950	3,160
Turboprop Hours (000s)					
1999*	2000	2001	2002	2003	2004
1,690	1,720	1,750	1,770	1,800	1,820

*Increase in aircraft and hours for 1998-1999 reflects the increase of fractional ownership on aircraft utilization.

TABLE 3. FIXED-WING TURBINE AIRCRAFT HOURS FLOWN

Turbojets					
Actual			Forecast		
1990	1998	1999*	2000	2001	2004
1,396	1,801	2,100	2,330	2,540	3,160
Average Annual Growth Rate (Percent)					
	1990-99	1998-1999	1999-00	2000-01	1999-04
	3.9	16.6	10.9	9.0	8.5
Turboprops					
Actual			Forecast		
1990	1998	1999*	2000	2001	2004
2,319	1,675	1,690	1,720	1,750	1,820
Average Annual Growth Rate (Percent)					
	1990-99	1998-1999	1999-00	2000-01	1999-04
	(3.4)	1.4	1.7	1.7	1.4

*Increase in hours for 1998-1999 reflects the increase of fractional ownership on aircraft utilization.