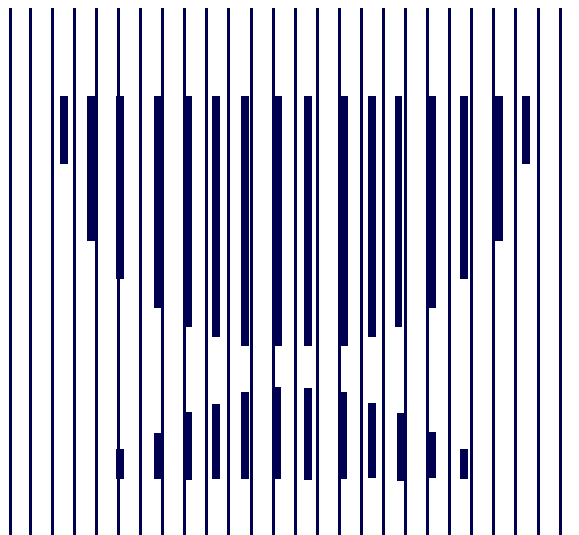# CBO MEMORANDUM

**PILOT RETENTION BONUSES
IN THE AIR FORCE**

June 1995

CONGRESSIONAL BUDGET OFFICE

CBO
MEMORANDUM

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SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515

In the 1980s, the U.S. Air Force predicted that a shortage of pilots would develop in the near future. In response, the Congress authorized the Aviator Continuation Pay (ACP) bonus program in 1989 as an interim measure to improve retention of pilots. Authorization for the ACP program, which both the Air Force and the Navy have used since then, has been extended twice, but the program is subject to reauthorization in the 1995 session of the Congress.

This Congressional Budget Office (CBO) memorandum was prepared at the request of the Subcommittee on Military Personnel of the House Committee on National Security to aid the subcommittee in its deliberations. The memorandum assesses the cost and retention effects of the current ACP program and two alternative compensation plans. In accordance with CBO's mandate to provide objective and impartial analysis, this memorandum contains no recommendations.

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Although the Air Force is adjusting its complement of personnel to compensate for the drawdown in force structure, it continues to project an overall shortage of pilots in the near future. The Air Force must contend with the dilemma of slowing down the training of new pilots to meet the needs of downsizing and simultaneously undertaking measures that will increase the retention of skilled pilots to combat its projected shortage. Among recent personnel management actions, the Air Force is reducing the number of officers in undergraduate pilot training (UPT) and reassigning (or banking) some UPT graduates to nonflying jobs until flying slots become available.

In order to improve pilot retention, the Air Force has also relied heavily on its Aviator Continuation Pay (ACP) program. But authorization to pay ACP expires this year, and the need for reauthorization is likely to be the subject of Congressional debate.

Under the current ACP plan, the Air Force is authorized to offer a bonus of up to $12,000 to qualified pilots of fixed-wing aircraft who agree to remain on active duty through their 14th year of service. The Congressional Budget Office (CBO) estimates that with the current ACP program, the Air Force will have a small shortage of pilots in 1996 and a somewhat larger one by 2000. The shortage will vary considerably, however, by major weapon system (that is, by fighter, bomber, tanker,

strategic airlift, theater airlift, helicopter, and trainer aircraft). In fact, pilot surpluses are projected in 1996 for the bomber, tanker, and theater airlift types of aircraft.

In addition to examining the current ACP plan, CBO looked at two alternative plans that involve further targeting bonuses as a means of combating the projected shortfall. The first plan would target bonuses based on the projected shortage of pilots by type of aircraft. Under this approach, pilots in communities (that is, groups of pilots who fly similar types of aircraft) with greater shortages would receive larger bonuses. The second scheme would not only tie the bonus to the shortage of pilots by type of aircraft, as in the previous plan, but would also target by year of service (YOS), mirroring the approach used by the Navy.

According to CBO estimates, all three bonus plans would meet nearly 99 percent of the projected requirements for pilots in 1996 and at least 90 percent in 2000. Each plan would retain almost enough pilots in all major weapon systems to meet or exceed total flying requirements. Total flying requirements include the critical "cockpit" positions and personnel needed to employ operational aircraft. Thus, all three plans would increase pilot retention sufficiently to keep more than the required number of pilots to fill critical cockpit billets in both 1996 and 2000. The two alternative plans that involve more targeting of the bonuses would cost less than continuing the current ACP plan; the most targeted plan would be the least costly.

The Air Force's ability to retain the pilots it needs to maintain combat readiness has been influenced to a large extent by the lure of civilian opportunities.[1] Thus, the demand for pilots by the commercial airlines will figure prominently in the Air Force's efforts to retain pilots.

Although certain quality-of-life issues--such as family separation, quality flying time, desirable job assignments, and promotion opportunities--are possible factors contributing to a pilot's decision to remain in the military, it is the prospect of employment with one of the major commercial airlines that serves as the primary influence. A "blue-ribbon" panel established by the Department of Transportation's Federal Aviation Administration (FAA) estimated that the total demand for civilian pilots by major airlines will remain at around 1,500 new employees through 1997, but is expected to rise between 1998 and the early part of 2000.[2] New hirings during that period are projected to average 3,500 annually.[3] However, the anticipated increase in new employees by the commercial airlines may not exert additional pressure on the Air Force's efforts to retain its pilots. According to the report of the blue-ribbon

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1. See Claire M. Levy, *The Civilian Airline Industry's Role in Military Pilot Retention: Beggarman or Thief?* Report DRR-768-OSD (Santa Monica, CA: RAND, forthcoming), p. 3.

2. See the report of the Department of Transportation's blue-ribbon panel, *Pilots and Aviation Maintenance Technicians for the Twenty-First Century: An Assessment of Availability and Quality* (Federal Aviation Administration, August 1993), p. 103.

3. Ibid.

panel, the industry's new pilots could be drawn from an existing pool of FAA-qualified aviators.[4]

Competition for Pilots Over the Long Term

Other factors may also limit the impact of airline hiring on Air Force retention. For example, although civilian-trained pilots generally have less experience than their military counterparts, the gap appears to be narrowing. Moreover, employment in the civilian sector is far from certain. Airline mergers, strikes, or failures have made the commercial environment less stable than the military. The bankruptcies of Pan Am, Eastern, and Midway in 1991 are a reminder of the industry's potential for turbulence. Thus, the short-term demands for military pilots in the civilian sector may not seriously affect the Air Force's quest to retain an adequate number of pilots in the future.

In the longer term, however, the Air Force could face heightened competition for its pilots. A combination of the military drawdown, increased hiring in the civilian sector, and the prospect of less reliance by commercial airlines on civilian-trained pilots could affect retention. Although the severity of that threat is unclear at this time, the Air Force continues to support ACP to help retain pilots.

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4.   Ibid., p. x.

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The Congress first authorized the Air Force's ACP program in 1989. The Air Force has used its authority to offer eligible pilots up to $12,000 a year in exchange for a commitment to remain in the military through their 14th year of service. The ACP program and other personnel management actions have improved the pilot situation, but CBO projects that even if the current bonus program continued, the Air Force would experience an overall shortage of 203 pilots in 1996, 1.4 percent of total requirements (see Table 1). That shortage is expected to grow to 1,039 pilots--7.3 percent--in 2000. Nonetheless, the projected shortage could be much smaller in the wake of the Air Force's current downsizing efforts if the drawdown results in lower pilot requirements than those currently planned.

Shortages Vary According to Type of Aircraft

Although the projection of an overall shortage of pilots in the Air Force is important, knowing how the shortfall varies according to type of aircraft plays a critical role in managing personnel effectively. Based on the Air Force's requirements and CBO's projections, continuing the current ACP program would result in shortfalls among four of the pilot communities in 1996. The largest shortage would occur among fighter pilots, and a shortage of strategic airlift pilots would be the next largest (see

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TABLE 1.   ESTIMATES OF PILOT SHORTAGES IN THE AIR FORCE
IF THE CURRENT ACP PROGRAM IS CONTINUED

	1996	2000
Projected Requirements	14,495	14,303
Flying	9,387	9,249
Nonflying	4,491	4,442
Other	617[a]	612
Projected Inventory	14,292	13,264
Projected Shortage	203	1,039

SOURCE: Congressional Budget Office based on U.S. Air Force data.

a.   Includes Air Force Institute of Technology/Professional Military Education and Transient requirements.

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Table 2). Three other communities--bomber, tanker, and theater airlift pilots--are expected to have surpluses. By 2000, overall shortages will be larger, and only two communities will show surpluses.

Those conclusions, however, are influenced in part by the Air Force's policies about allocating pilots to flying and nonflying positions. Although cockpit positions require that a pilot be trained for a specific aircraft, nonflying positions may be filled by any pilot regardless of his or her cockpit experience. As a consequence, pilots in major weapon systems (MWSs), where surpluses exist, are assigned to fill nonflying positions rather than pilots from communities experiencing shortages.

The sensitivity of the shortage problem to the allocation of nonflying requirements cannot be overemphasized.[5] A reallocation of nonflying positions in 2000 could generate shortages in MWSs where none are projected and exacerbate the shortages that are currently projected (see Figure 1). But the projected inventory in each MWS more than meets its flying requirements. The surplus is noteworthy because flying positions are determined, by and large, by the number of available cockpit seats and remain unchanged under different allocation systems. As a consequence, this analysis relies on flying positions as a key indicator of the efficacy of alternative compensation plans.

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5.   This point is underscored in a study by RAND. See Harry J. Thie and others, *A Critical Assessment of Total Force Pilot Requirements, Management, and Training* (Santa Monica, CA: RAND, 1994), p. 58.

TABLE 2.   PILOT SHORTAGES BY TYPE OF AIRCRAFT
                  (In number of pilots)

Type of Aircraft	Inventory 1995	Shortages 1996	Shortages 2000
Fighter	4,722	938	1,227
Bomber	1,284	-140	27
Tanker	2,930	-583	-335
Strategic Airlift	2,765	74	164
Theater Airlift	2,016	-197	-269
Helicopter	657	64	56
Trainer	343	46	170

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FIGURE 1. PILOT INVENTORY AND REQUIREMENTS IN 2000 BY MAJOR
WEAPON SYSTEM UNDER THE CURRENT AVIATOR
CONTINUATION PAY PROGRAM
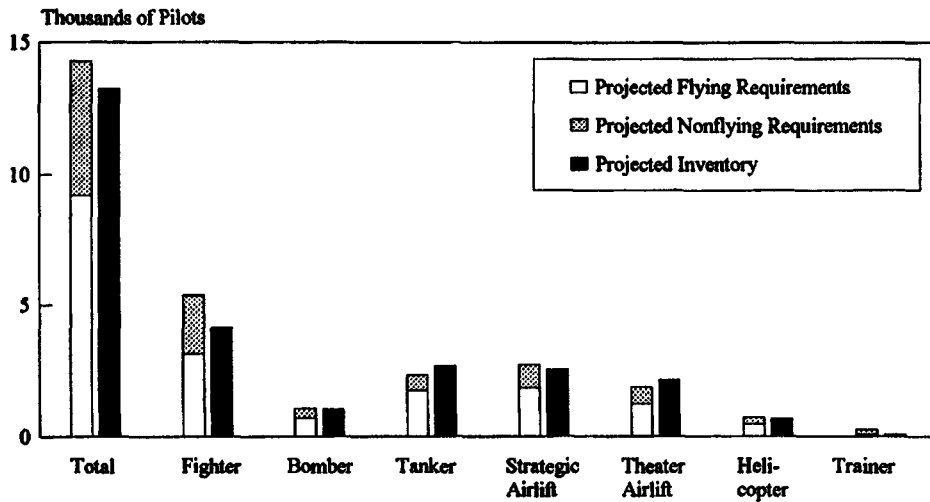
SOURCE: Congressional Budget Office based on data from the Department of the Air Force.

NOTE: Nonflying requirements include Unspecified, Air Force Institute of Technology/Professional Military
Education, and Transient requirements.

The Air Force periodically reviews its pilot requirements. Its latest review, conducted in 1994 and 1995, has resulted in a 20 percent reduction in the number of pilots needed for staff billets during the 1996-2000 period. Nonetheless, the Air Force continues to project a general shortage of pilots and urges reauthorization of ACP to deal with the problem.

Alternative Bonus Plans

CBO examined three alternative compensation plans designed to encourage pilots to remain on active duty. All three plans offer bonuses to pilots of fixed-wing aircraft who have completed at least seven but less than 13 years of active-duty service and who agree to remain in the Air Force to complete 14 years of commissioned service. Plan 1 would continue the current Aviator Continuation Pay program. That program involves a bonus ranging from $6,000 to $12,000 a year payable to all pilots of fixed-wing aircraft (see Table 3). The bonus varies by year of service, and the smallest bonus is paid to pilots with 13 years of service. In accordance with Air Force policy, helicopter pilots are not eligible for a bonus, even though that community is expected to be short of pilots by 2000. CBO's analysis assumes, however, that bonuses will be made available to all eligible pilots of fixed-wing aircraft, notwithstanding any pro-

TABLE 3.	BONUS PAYMENTS UNDER THE CURRENT PLAN

Years of Service at Signup for Bonus Plan	Annual Payment (In dollars)
8	12,000
9	11,000
10	11,000
11	9,500
12	8,000
13	6,000

SOURCE: Congressional Budget Office based on data from the Department of the Air Force.

jected surpluses. Thus, even though the bomber, tanker, and theater airlift communities are expected to have a surplus of pilots, bonuses would be offered to their members under this option. The rationale for such payments stems from the Air Force's contention that to do otherwise would result in inequitable treatment of its pilots.

Plan 2 recognizes the differences in the degree of shortages being experienced by the various pilot communities. Under that plan, bonus payments would range from $1,750 to $12,000, but would not vary by YOS (see Table 4). Instead, bonuses would be targeted by type of aircraft and their relative degree of personnel shortage. Thus, pilot communities that have larger projected shortages would be offered larger bonuses.

Plan 3 would offer bonus payments in accordance with the current Navy ACP plan. It is designed to meet shortages more efficiently and hold down costs. Plan 3 would make bonus payments available only to pilots in those fixed-wing communities that expect shortages. Moreover, the bonus would vary by YOS, with larger payments being offered to junior personnel (see Table 5). Under that option, only fighter, strategic airlift, and trainer pilots would be eligible, since significant shortages are projected for their communities.

TABLE 4.	ILLUSTRATIVE BONUS PAYMENTS IN PLAN 2 BASED ON PILOT SHORTAGES	

Aircraft Type	Annual Payment (In dollars)
Fighter	12,000
Bomber	2,000
Tanker	1,750
Strategic Airlift	12,000
Theater Airlift	1,750
Trainer	12,000

SOURCE: Congressional Budget Office.

NOTE: Under Air Force policy, helicopter pilots are not eligible for bonuses.

TABLE 5. ILLUSTRATIVE BONUS PAYMENTS FOR FIGHTER,
STRATEGIC AIRLIFT, AND TRAINER PILOTS IN PLAN 3

Years of Service for Bonus Plan	Annual Payment (In dollars)
8	12,000
9	12,000
10	11,750
11	11,500
12	11,250
13	11,000

SOURCE: Congressional Budget Office.

Precedents for Targeting Incentive Pay

In the past, the Air Force has opposed schemes such as those represented under Plans 2 and 3. In general, the service maintains that targeting bonuses in that manner would adversely affect morale, possibly intensify retention problems, and ultimately increase pilot shortages. But precedents for targeting based on the degree of personnel shortage are widespread in the military compensation system; they include, among others, special and incentive pay for physicians, recruiting and reenlistment bonuses for enlisted personnel, and certain housing allowances.

Moreover, the Navy uses the approach in its aviation bonus program. For fiscal year 1995, in fact, the Navy adjusted the program to ensure that bonuses would be paid only in those pilot communities in which there are current or projected shortages. The Navy eliminated the bonuses offered to pilots in three of its communities and offered a bonus to pilots in a community that had been ineligible for bonuses the previous year.[6]

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6.   Ernest Blazer, "Less Cash for Fliers," *Navy Times* (November 28, 1994), p. 4.

CBO evaluated the various alternative bonus plans by employing an inventory-flow model that it developed using data provided by the Air Force. CBO modeled each of the Air Force's pilot communities separately. The inventory models simulate the retention behavior of pilots in accordance with current and projected continuation rates (that is, the probability of pilots' remaining in the service from one year to the next).

In the model, alternative compensation plans affect pilot retention as follows: a compensation option results in a change in pay, which, when coupled with the relevant pay elasticity (that is, the percentage change in retention with respect to the percentage change in pay), gives rise to a change in the continuation rate and in turn yields an increase in pilot retention. The pay elasticity reflects key factors that influence a pilot's decision to remain in the service, such as military pay levels, pay available in the civilian sector, type of military aircraft flown, availability of pilot jobs in the commercial sector, the overall unemployment rate, and general satisfaction with flying in the military. Those influences are reflected in the variables used to derive the elasticity--namely, relative military and civilian pay, hiring of pilots by domestic airlines, type of aircraft, and the unemployment rate (see the appendix for a more detailed discussion of the model).

All of the bonus options would meet nearly 99 percent of the projected requirements for pilots in 1996 (see Table 6). All of the compensation plans would improve retention so as to exceed the projected flying requirements for eligible aircraft. By the year 2000, under the three plans, pilot requirements might exceed inventory by as much as 10 percent. Requirements for flying positions, however, would be exceeded in all major weapon systems except trainers. But the trainer situation will soon be of little consequence because the Air Force is phasing out the trainer category as a career field and transferring most trainer requirements to other categories of major weapon systems. Moreover, in view of the Air Force's current efforts to reduce force structure, it might be possible to lower requirements for the number of pilots below current plans. If so, all three plans would show a modest but consistent improvement in alleviating the pilot shortage in the later years as well.

Both Plan 2, which links bonuses to type of aircraft, and Plan 3, which targets bonuses only to communities that have pilot shortages and varies the bonus by YOS, would add approximately the same number of pilots during the critical career interval of 8 to 13 years of military service. Both plans would add fewer pilots than the current ACP plan. In contrast to the ACP plan, however, the two alternatives appear to be more efficient. They would result in fewer pilots in those communities that have projected surpluses, while adding a few more pilots where shortages are expected. That is true on a man-year basis because of targeting by YOS. In this regard, Plan 3 is the most efficient, because bonuses are paid only in pilot communities in which

TABLE 6.   SUMMARY OF ALTERNATIVE COMPENSATION PLANS

	Current Aviator Continuation Pay Plan		Targeting of Bonus by Type of Aircraft		Targeting of Bonus by Pilot Shortage and Years of Service	
	1996	2000	1996	2000	1996	2000
Projected Pilots as a Percentage of Total Billets						
Total	99	93	98	91	98	90
Added Pilots in Years of Service 8 to 13						
Total	831	824	767	807	748	805
Projected Pilots as a Percentage of Flying Requirements						
Fighter	142	133	143	135	143	134
Bomber	180	152	177	142	177	139
Tanker	169	154	167	141	166	139
Strategic Airlift	143	139	143	141	143	141
Theater Airlift	165	171	163	159	163	156
Helicopter	137	138	137	138	137	138
Trainer	226	97	226	98	226	98
Total	153	144	152	140	152	139

Cost of Alternative Compensation Plans (In millions of dollars)[a]

1996	101	99	98	
2000	134	110	106	
1996-2000	595	528	515	

SOURCE: Congressional Budget Office.

NOTE: The number of pilots shown here does not represent the total number of pilots projected to receive bonus payments. Instead, these projections represent "fence sitters" who would decide to remain in service rather than separate as a result of additional compensation. As mentioned in the text, flying positions are the focus of attention in this analysis because their requirements are not subject to change in response to arbitrary assumptions governing the allocation of pilots to nonflying positions.

a.   The cost of each option does not include the cost that would be incurred through the expiration of the current ACP program in 1995, but only that associated with the alternative compensation plan. Thus, the cost of each plan excludes the anniversary payments remaining to be paid to pilots under the current ACP program.

shortages exist. This alternative minimizes paying what economists call "economic rent"--in this case, the payment of bonuses to pilots who would have remained on active duty in the absence of a bonus.

Moreover, the two alternative plans would be less costly than the current ACP program. Over the 1996-2000 period, either Plan 2 or Plan 3 could save $70 million to $80 million, compared with the Air Force's preferred Plan 1.

CONCLUSION

In view of the projected shortage of pilots in the Air Force, personnel management actions will be necessary to combat the shortfall. Whether those efforts will continue to include a pilot bonus will be determined by the Congress when the current ACP bonus plan expires on September 30, 1995. If the Congress decides in favor of a bonus program, the nature of the plan would also be determined at that time.

All three of the pilot bonus plans that CBO analyzed would satisfy 90 percent or more of the total pilot requirements of the Air Force through 2000, and they would exceed the total requirements for flying positions for every major type of aircraft. (As mentioned previously, Air Force plans call for phasing out the trainer category as a major career field.) The two more targeted plans would be less costly than the

current ACP plan, however. A plan that targets the bonus only to those communities that have pilot shortages--as the Navy plan does--has the added feature of being the most efficient because it focuses the use of bonuses on the areas that most need improved retention.

The Congressional Budget Office used data obtained from the Departments of Defense, Air Force, and Navy in conducting its analysis. It used Air Force data about the number of pilots by type of aircraft (fighter, bomber, tanker, strategic airlift, theater airlift, helicopter, and trainer) and by years of service (YOS). CBO used the Air Force's continuation rates in fiscal year 1992 to project the number of all aircraft pilots in 1993 through 2000.

CBO estimated the changes in projected pilot inventories that result from increases in compensation by using pay elasticities (the percentage change in retention rates with respect to a percentage change in pay). Ideally, estimates of pay elasticities would be desirable by YOS for each Air Force pilot community, but such estimates were not available to CBO. As proxies, CBO used a set of elasticities based on Navy data about the behavior patterns of jet, propeller, and helicopter pilots with regard to continuation in the service as estimated by the Center for Naval Analyses.[1]

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1.   Memorandum from Donald J. Cymrot of the Center for Naval Analyses to the Deputy Chief of Naval Operations, Manpower, Personnel and Training, January 25, 1989.

Assumptions

The validity of applying estimated Navy pay elasticities to Air Force pilots is justified by the method of estimation and the application of those pay elasticities only to marginal responses of pilots. The pay elasticities were transformed from coefficients in a regression equation that related retention to relative military and civilian pay, pilots hired by domestic airlines, the annual unemployment rate, and interactive dummy variables for each of the three categories of aircraft (jet, propeller, and helicopter). Since the statistical technique used to estimate the coefficients was a logit equation, the pay elasticities were estimated from the coefficients using the following relationship:

$$e = b(1 - p)M$$

where:

e = the elasticity estimate

b = the estimated coefficient of the regression equation

p = the probability of remaining in the service

M = the mean value of the independent variable (pay)

CBO adjusted the pay elasticities to reflect current trends. It used the Administration's assumptions about pay raises to project cost-of-living increases in basic pay and aviation career incentive pay (ACIP), where applicable.

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Methodology

Although the problem of pilot shortages is often discussed collectively, there are important differences in pilot shortages by type of aircraft. In particular, the retention behavior of pilots tends to vary by pilot community. A model that treats the various pilot communities as a group within the Air Force would ignore those differences. Consequently, CBO constructed separate inventory flow models of pilot retention for each pilot community in the Air Force. The inventory models simulate the retention behavior of pilots in accordance with current and projected continuation rates (that is, the probability of pilots' remaining in service from one year to the next). Each of the compensation plans examined in this analysis results in a percentage change in pay for pilots in each community. When multiplied by the relevant pay elasticity, the change in pay produces a percentage change in the continuation rate of each pilot community and, in turn, in total pilot retention.

Projection of the Base Case. CBO also constructed estimates of pilot inventory for the "base case" for each type of aircraft from 1993 through 2000. The base case is the active force profile of pilots if no new compensation plan was established and the current Aviator Continuation Pay (ACP) program expired in 1995. Air Force continuation rates for each community by YOS in 1993 were applied to each pilot inventory for the same year. The resulting projection for 1994 was adjusted to reflect the availability of ACP. The projected 1994 inventory was then used with the Air

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Force's projected continuation rates for 1994 to arrive at the 1995 inventory. The inventories for 1996 through 2000 were projected in a similar manner. CBO then used those baseline projections to evaluate the impact of alternative compensation plans on improving Air Force retention.

Impact of Alternative Compensation Plans. In order to evaluate alternative plans, the models first compute total pilot compensation for the base case (regular military compensation plus cost-of-living adjustments after 1995 and ACIP) for each pilot community by YOS:

$$Y_{Bitj} = \Phi \times RMC_{itj} + ACIP_{itj}$$

where:

Y_B = total compensation under the base case

i = type of aircraft (fighter, bomber, tanker, strategic airlift, theater airlift, helicopter, or trainer)

t = year (1993 through 2000)

j = YOS

Φ = cost-of-living factor

RMC = regular military compensation

ACIP = aviation career incentive pay

Next, the total compensation that would be received under each alternative pay plan is computed (including bonuses if applicable, any additional ACIP, and ACIP cost-of-living adjustments where appropriate):

$$Y_{Aitj} = \Phi \times RMC_{itj} + [\Phi] \times ACIP_{itj} + Bonus_{itj}$$

where:

A = alternative compensation plan

Bonus = bonus amount under alternative pay plan

From the two pay levels, percentage changes in pay ($\%\Delta Y_{itj}$) are determined for each pilot community by YOS. Those changes in pay are then multiplied by the appropriate pay elasticity, e_p (where "p" denotes the type of aircraft), yielding an estimated percentage change in the continuation rates ($\%\Delta CONT_{itj}$, where CONT is the continuation rate) for some YOS. That is:

$$\%\Delta CONT_{itj} = \%\Delta Y_{itj} \times e_p$$

All continuation rates are adjusted to take into account any percentage changes in continuation rates that occur under the alternative pay plan. In some YOS cells--those in which compensation does not change--continuation rates are unaffected. Thus, the complete set of new continuation rates can be expressed as:

$$NCONT_{itj} = CONT_{itj} + \%\Delta CONT_{itj}$$

where:

$NCONT_{itj}$ = new continuation rates

Those new continuation rates are then applied to the inventory of the pilot community to arrive at the new inventory under the alternative compensation plan. In projecting the number of pilots in each YOS cell under alternative plans, care must be taken to adjust for those pilots who have made a previous program commitment in an earlier year, since their continuation rate is projected to be 1.0 during the term of their commitment. Although those pilots clearly should be counted ultimately as part of the inventory in the appropriate YOS cell, they should not be included among those eligible for a new alternative compensation pay plan. This adjustment is accomplished as follows for each YOS cell inventory (C):

$$C_{Aitj} = C_{Ai,t-1,j-1} - [TAKE_{i,t-1,j-1}] \times NCONT_{i,t-1,j-1} + [TAKE_{i,t-1,j-1}]$$

given that

$$TAKE_{i,t-1,j-1} = C_{Ai,t-1,j-1} - C_{Bi,t-1,j-1}$$

where:

TAKE = pilots who are under a previous alternative pay program

The new pilot inventory is compared with the base case to estimate the changes resulting from each compensation alternative. That procedure involves summing across each type of aircraft for both the base case and the alternative plan and then taking the difference:

$$TOT_{Btj} = \Sigma \ C_{Bitj}$$

$$TOT_{Atj} = \Sigma \ C_{Aitj}$$

and hence

$$DIFF_{ABtj} = TOT_{Atj} - TOT_{Btj}$$

where:

TOT = total inventory by fiscal year and year of service

$DIFF_{AB}$ = difference between the inventory under the

alternative plan and the base case