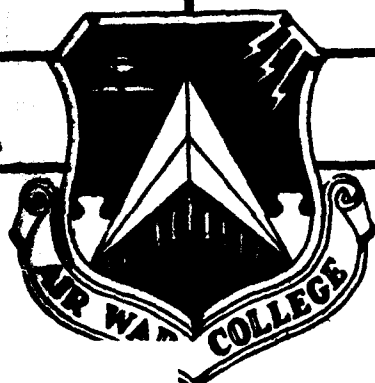




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RESEARCH REPORT

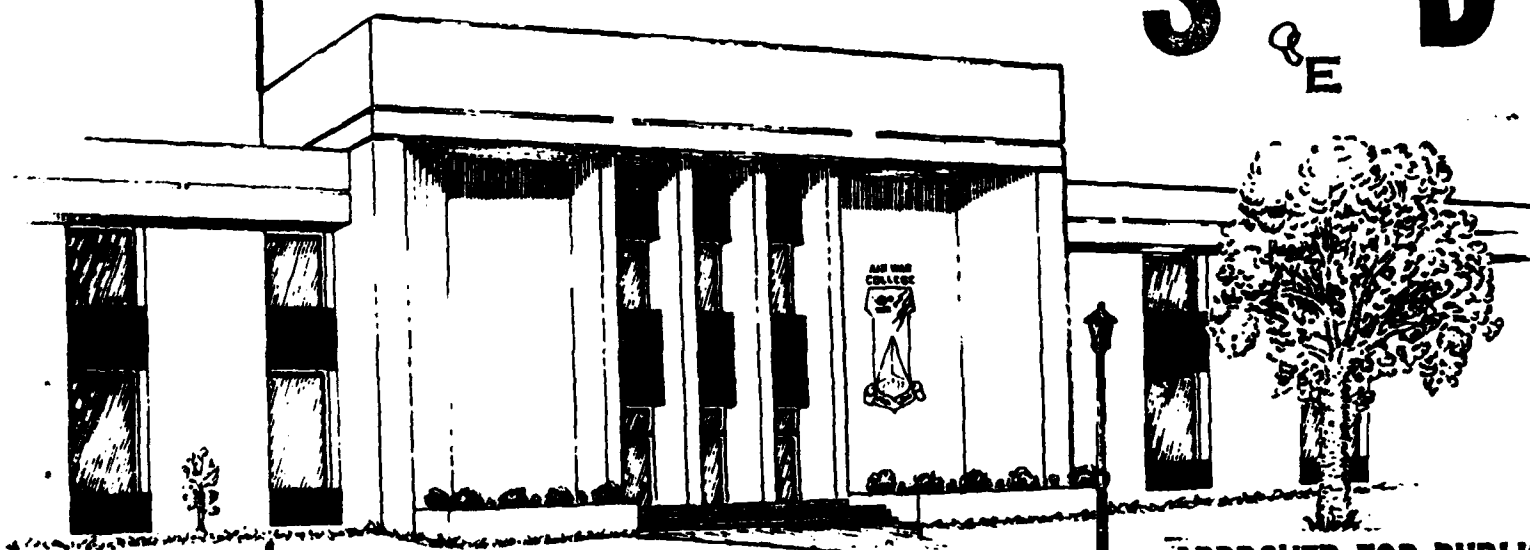
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PILOT RETENTION: A QUESTION OF
LEADERSHIP EFFECTIVENESS AND SQUADRON SIZE?

LT COL EDWARD G. HOFFMAN

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AIR UNIVERSITY
UNITED STATES AIR FORCE
MAXWELL AIR FORCE BASE, ALABAMA

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PILOT RETENTION:
A QUESTION OF LEADERSHIP EFFECTIVENESS AND SQUADRON SIZE?

by

Edward G. Hoffman
Lt Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY
IN
FULFILLMENT OF THE RESEARCH
REQUIREMENT

Research Advisor: Colonel Bryan D. Strickland

MAXWELL AIR FORCE BASE, ALABAMA

APRIL 1988

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AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Pilot Retention: A Question of Leadership
Effectiveness and Squadron Size?

AUTHOR: Edward G. Hoffman, Lieutenant Colonel, USAF

The impending crisis in U.S. Air Force pilot retention forms the background for this investigation into the relationship between leadership effectiveness, squadron size, and pilot retention rates. The current retention situation was reviewed first. Flying squadron commanders in the Military Airlift Command, Strategic Air Command, and Tactical Air Command were surveyed to gather data on squadron demographics, time demands on squadron commanders, reasons for separation, and the commanders' perceptions and attitudes toward retention, leadership, and squadron size. An analysis yielded no statistically significant relationship between squadron size and retention, but four other areas were identified that appear to have demonstrable effects upon retention. Recommendations are made to increase squadron commander leadership effectiveness and improve pilot retention.

BIOGRAPHICAL SKETCH

Lieutenant Colonel Edward G. Hoffman (B.S., U.S. Air Force Academy, M.B.A., University of California, Los Angeles) has been involved in officer recruiting and retention for most of his career. He has taught both AFROTC at Virginia Polytechnic Institute and State University and at the U.S. Air Force Academy. His most recent assignment was a C-141 Squadron Commander at Travis AFB, California, where he worked the pilot retention issue first hand.

Lieutenant Colonel Hoffman is a command pilot with 5,000 hours flying time in the C-141, KC-135, C-133, UV-18, and EC-47. His military decorations include the Distinguished Flying Cross, Meritorious Service Medal with one oak leaf cluster, Air Medal with four oak leaf clusters, and Air Force Commendation Medal with two oak leaf clusters. He is a distinguished graduate of both Squadron Officer School and the Air Command and Staff College. Lieutenant Colonel Hoffman is a graduate of the Air War College, class of 1988.

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ACKNOWLEDGMENTS

A special thanks to three people who made this project possible. Lt Colonel Jim Smith, Air War College/XPX, provided many hours of advice and counsel on the construction and administration of the survey; assisted in obtaining Headquarters U.S. Air Force approval for the survey; and offered explanations and suggestions for the statistical analysis. Mr. Nick Fank, 1973rd Communications Group/SVY, provided invaluable computer support in processing the survey data and tailoring the statistical analysis. Colonel Bryan Strickland, Air War College/DFL, offered much needed insight, suggestions and support in writing this report. It could not happen without their support.

CHAPTER I

INTRODUCTION

Leadership can be simply defined as influence.

(15:439) Effectiveness is producing the desired result.

(15:421) Effective leadership, then, is the ability to influence others towards a desired result. Since the squadron is the basic organizational unit in the operational Air Force, the leadership effectiveness of the squadron commander is crucial in accomplishing the unit mission. Koontz and O'Donnell assert that up to 40 percent of the total results in a squadron could be induced by the leadership ability of the commander.(18:439) But leadership effectiveness is itself affected by various factors. The leader, the environment and the followers all have an impact.

This report focuses on one aspect of the environment in which a commander operates, the size of the squadron. The measure of leadership effectiveness used is pilot retention. Whether or not pilot retention is actually accepted as a valid measure of a squadron commander's leadership effectiveness is not the issue; there are senior Air Force leaders who do. The Commander-in-Chief, Military Airlift Command (CINCMAC) has told his squadron commanders that pilot retention is their responsibility. A

Headquarters, United States Air Force Pilot Retention Conference in March 1987 identified increased squadron commander leadership involvement in retention as an issue.(29:4-5)

This report will test the hypothesis that squadron commander leadership effectiveness, as measured by pilot retention, is inversely proportional to squadron size; that is, smaller squadrons allow increased leadership effectiveness and hence, higher pilot retention. To test this hypothesis, squadron commanders in Military Airlift Command (MAC), Strategic Air Command (SAC), and Tactical Air Command (TAC) were surveyed. (See Appendix A for the survey administered, and see Appendix B for a summary of the responses.) Three major air commands (MAJCOMs) were surveyed to gather data on a large cross section of different sized flying squadrons, although the focus of this study will be upon MAC airlift squadrons. The other MAJCOMs will be used to highlight similarities and differences.

It costs the Air Force almost \$13 million to train a C-5 pilot from Undergraduate Pilot Training through completion of aircraft commander upgrade training.(23:10) For every two of these officers who decide to separate from the Air Force, the replacement training cost alone could buy another C-130 aircraft! In an era of declining financial resources, the Air Force cannot afford unnecessary pilot losses.

CHAPTER II
MILITARY AIRLIFT COMMAND SQUADRON ORGANIZATION

Military Airlift Command squadrons differ significantly in size and structure from squadrons in other MAJCOMs. For instance, this project survey indicated the average comparisons in Table 1.

Comparative Squadron Size

	<u>MAC</u>	<u>SAC</u>	<u>TAC</u>	<u>TOTAL SURVEY</u>
Crews/squadron	27.3	20.9	27.5	25.8
Officers/squadron	68.8	88.0	43.2	63.6
Enlisted/squadron	86.7	30.5	34.4	49.5
Personnel/squadron	155.5	118.5	77.6	113.1
Span of control*	10.9	9.2	6.5	8.6

*Subjective assessment of the squadron commander,
not necessarily the organization structure.

Table 1

Tactical Air Command squadrons are approximately half the size of MAC squadrons, while SAC squadrons are approximately three-fourths the size. SAC squadrons have twice as many officers as TAC units and almost 30 percent more than MAC squadrons. The span of control varies from almost 11 for MAC to over six for TAC.

The basic organization of MAC airlift squadrons is spelled out in MAC Regulation 23-9, Military and Tactical Airlift Squadrons. (26:1-3) The size of the squadron is determined by the number of primary aircraft authorized (PAA) and a crew ratio per aircraft. For 1988, the average MAC airlift squadron figures are presented in Table 2.

Average MAC Airlift Squadron Size

	<u>C-130</u>	<u>C-141</u>	<u>C-5</u>
PAA	15/16	15/16	15/16
Crew ratio	1.75	2.0	1.8

(21:1)

Table 2

In addition to the crews assigned, an overhead structure is required to provide leadership, supervision, and administrative support. In a notional MAC airlift squadron, this structure could include approximately five officers, 12 enlisted and one civilian secretary. (1:H-II-3) If squadron size was reduced by creating additional squadrons, this would be the incremental cost of a smaller squadron size for MAC. Smaller squadrons may be part of the answer to alleviating the pilot retention dilemma.

CHAPTER III

PILOT RETENTION

Pilot retention is a vital concern to any flying organization. The huge costs of training a fully mission ready pilot are considerable, and an adequate pilot retention is necessary to provide continuity of operation, groom future operational leaders and accomplish the mission.

The U.S. Air Force attention has focused on the six to eleven years of service group. This group comprises the majority of pilots who have completed their initial obligation and have not committed themselves to an Air Force career as indicated by selection and promotion to the rank of major. As the Undergraduate Pilot Training (UPT) commitment increases to eight years for those entering UPT in 1988, the decision point for pilots will be pushed back toward a minimum of nine years total service.

Retention can be measured several ways. The simple retention rate (SRR) is the number of pilots without a commitment who did not separate in a given year group. The cumulative retention rate (CCR) is the "percent of officers entering the 6th year who would complete the 11th year assuming current retention rates [SRR]." (32:2) The CCR is determined by multiplying together the SRRs for each of the six to eleven year groups. For instance, a SRR of 80

percent for each year group could yield a 26 percent CCR (.8 X .8 X .8 X .8 X .8 X .8). Most attention is focused on the CCR, since it indicates how many experienced pilots the Air Force can expect to retain over time.

Recent Trends

Pilot retention has varied greatly during the last nine years. Substantial pay increases in the early 1980s produced a temporary improvement. The recent history of the pilot CCR is illustrated in Table 3.

Pilot Cumulative Continuation Rate											
	FY	<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>87</u>	<u>1/88*</u>
Air Force		26	42	54	68	78	72	59	56	48	48
ATC		46	51	51	69	70	61	47	40	37	36
MAC		18	34	51	62	79	66	49	46	39	39
SAC		27	34	51	66	76	77	60	55	48	48
TAC		27	42	56	69	80	73	59	54	43	42

*First quarter fiscal year 1988

(10:7; 32:8; 35:15)

Table 3

As shown, pilot retention reached its nadir of 26 percent in fiscal year 1979 and climbed dramatically until peaking in 1983 at 78 percent. It has declined steadily since then, falling 30 percentage points to a CCR of just 48 percent in early 1988.

As a benchmark, the Air Force needs approximately a 60 percent CCR to maintain the pilot force.(35:15) The CCR has been below that for the last three years.

Reasons

The mass exodus of pilots today shares many commonalities with the Air Force retention woes of 1979. An exit survey of pilots in 1979 showed job satisfaction, geographic stability, little say in future assignments, job opportunities, and senior Air Force leadership as the most often cited reasons for separation.(32:15) A mid-1980s exit survey yielded the same reasons, but in a different order. Future assignments and geographic stability surpassed job satisfaction as a dissatisfier, while the last two remained the same.(32:15)

More recent evidence points to some other problems. A January 1987 Air Force-wide retention survey of over 4,000 junior pilots indicated that 40 percent of the five to seven year group were definitely planning on separation. An average duty day in excess of ten hours was reported by a majority of the pilots responding. Two-thirds of the officers said they spent at least half of their time on nonflying additional duties. The promotion system (and the associated Officer Effectiveness Report system) was cited as ineffective by over 2,000 officers. Overall, dissatisfaction with the Air Force was perceived as the most influential factor in a pilot's decision to separate.(30:1-2)

Military Airlift Command wing commanders identified the four most common reasons for MAC pilots separating: geographic and personal stability, erosion of entitlements, Air Force personnel policies, and increased opportunities outside.(23:2) The MAC retention problem is generally much worse than the Air Force as a whole. While the 1987 Air Force pilot CCR was 48 percent, the tactical airlift CCR was 46 percent and the strategic airlift CCR was just 32 percent. However, the helicopter CCR remains a healthy 69 percent.(35:15)

An April 1987 letter to the editor of the Air Force Times from a young MAC pilot listed still more reasons for poor retention. Permanent change of station (PCS) requirements, working spouses, pressure to "fill the squares," lack of recognition for flying skills, nonflying additional duties, and disillusionment with superiors were all listed as primary dissatisfiers.(8:21) The ensuing debate in the letters to the editor column indicated that there was a large segment of young pilots who agreed with the author.

An often cited reason for separating from the Air Force is money. General Duane H. Cassidy, former Air Force Deputy Chief of Staff for Personnel and current Commander-in-Chief, Military Airlift Command, told the U.S. Senate in 1987 that "our people are experiencing the largest pay gap since creation of the all-volunteer force."(16:3) This fact is not lost on pilots with ample flying opportunities

outside the Air Force. The U.S. airlines hired 7,010 pilots in 1987 alone.(11:6) This is over four times the total UPT production for the Air Force!

The economic lure of the airlines vice the Air Force was quantified in a study done by two Air Force Academy professors. Comparing the pay and benefits of each career, they concluded that "an Air Force career is a distant second place to flying with a major airline."(33:31) After reviewing other research on dissatisfiers within the Air Force, they forecast the growing airline alternative as a "formula for disaster" in Air Force pilot retention.(33:111)

A 1986 Air War College research project on retention identified leadership deficiencies as the key to retention. The report reviewed both the 1979 and 1986 separation factors and found similarities in both.(20:12) While acknowledging that the Air Force cannot compete on a dollar for dollar basis, it asserts that above a certain threshold of satisfaction, the internal dissatisfiers were the key. This conclusion is supported by other studies.(12:1,6; 22:ix)

So, the focus returns to leadership. As the Air War College report above concluded, "the Air Force must stop driving its people into the ground and thereby driving them out of the Force."(20:16) The squadron commander remains the vital link between our pilots and the Air Force leadership. The success or failure of leadership hinges upon how well he does his job.

U.S. Air Force Leadership Concerns

The magnitude of the pilot retention problem was acknowledged by the Air Force Chief of Staff when he directed the Air Staff to develop a "pilot retention game plan." (29:1) A Headquarters United States Air Force Pilot Retention Conference was held in March 1987 to address the issue.

Areas discussed included pay and entitlements, career uncertainties, family issues, and total force concerns. "Erosion [of benefits] and lack of confidence in the pay and entitlements package is negatively affecting retention." (29:2) Proposals advanced included a 50 percent increase in Aviation Career Incentive Pay, a pilot bonus, increased PCS reimbursement, and better temporary duty (TDY) reimbursement. The defense budget crunch for fiscal year 1989 has tabled all but the pilot bonus. Tentative plans now call for annual bonuses of \$9,000 to \$12,000 for pilots agreeing to stay three to five years beyond their initial service commitment. (16:3) Career uncertainty concerns included Defense Officer Personnel Management Act (DOPMA) amendments to allow fully qualified majors to serve for 20 years, fighting Congressionally mandated officer reductions, increasing pilot regular Air Force commission augmentation rates, and better documentation of total pilot requirements. (29:2-3) There has been no public announcement of progress in these issues to date. Family issues included dependent dental insurance, continental U.S. dependent space-available

travel, and spouse involvement.(29:3) The dental insurance plan was implemented in 1987, but the expanded dependent space-available travel is still pending. Spouse involvement was the subject of a select blue ribbon panel that investigated alleged command influence on spouses. The result has been a new Air Force policy prohibiting command pressure for, and consideration of, spouse participation in promotions and assignments.

Other issues raised included more commander involvement, better communication, emphasis on primary job performance for promotion, non-mission related additional duties, better assignment matching, and increased aircrew recognition.(29:4-7) The recently announced new Officer Evaluation System (OES) is a major attempt to redirect emphasis on primary job performance and enhance the promotion authority of base level commanders. The much debated leather flying jacket for aircrew members is meant to provide increased aircrew recognition. The issue of additional duties is being attacked by all the MAJCOMs.(10:7) Strategic Air Command has added squadron adjutants to handle many previous non-flying additional duties. Tactical Air Command and Air Training Command are reviewing squadron level operations to eliminate unnecessary additional duties. Military Airlift Command is adding 191 enlisted positions to flying squadrons to handle nonmission-related duties. MAC has also formulated lists of mission-related additional duties that crewmembers WILL

perform, officership additional duties that pilots MAY perform, and nonmission-related additional duties that crewmembers will NOT perform.(27:1-3)

Perhaps the most important issue is leadership. As the Chief of Staff recently said, "airlines tend to provide a 'golden parachute' for people who are dissatisfied for other reasons." (12:1) Many reasons for leaving the Air Force have been reviewed, and many initiatives have been undertaken to ameliorate these dissatisfiers; but this is all wasted unless the troops in the trenches know and understand the Air Force concerns and actions. This is where the squadron commander plays a key role. Assuming that the senior leadership has selected the right person for the job, the commander must have the tools and the time to work pilot retention. The Air Force is hard at work to provide the tools through the initiatives outlined above. They are not totally sufficient, but they indicate a commitment to improve the situation. The question remains, does the squadron commander have the time to properly meet all the other requirements of command, plus work the increasingly important personnel issues?

CHAPTER IV

FLYING SQUADRON COMMANDER SURVEY

A survey was undertaken to gather data with which to test the hypothesis that squadron commander leadership effectiveness, as measured by pilot retention, is inversely proportional to squadron size. Associated questions involve span of control, the number of officer/enlisted assigned to a squadron, and the perceived time available for personnel issues. Also surveyed were squadron commander perceptions of current retention issues and support available to the commander.

Survey Development and Approval

A preliminary survey was administered to former flying squadron commanders at the Air War College. Comments and results were used to fine tune the final survey. Questions 153-158 are demographic, i.e., squadron composition, TDY commitment, etc. Questions 159-167 determine how squadron commanders spend their time. Questions 168-173 inquire about reasons for pilot separations and the commander's perceived control over them. Questions 174-184 assess the commander's perceptions and attitudes towards retention, leadership, and squadron size. Question 185 asks for their unit's pilot retention rate. Questions 186-190 were open-ended inquiries about what the

commander would like to see changed or wished he had time to do in order to increase his leadership effectiveness and pilot retention. Approval to conduct the survey was received from the Air Force Military Personnel Center. See Appendix A for a copy of the final 38-question format of the survey.

Survey Administration

Lists of squadron commanders were obtained from headquarters MAC, SAC and TAC. These commanders were surveyed to provide a basis for comparison across different mission areas and various squadron sizes. The survey population included 59 MAC, 73 SAC and 85 TAC commanders. Responses were anonymous, with only the MAJCOM identified.

CHAPTER V

SURVEY RESULTS

A total of 151 responses are included in this analysis. See Appendix B for a summary of survey responses. These data reflect a subjective evaluation by the flying squadron commanders in early 1988. The data were not adjusted for tenure in command. The open-ended responses indicated that a few commanders had just several weeks experience, while some were approaching two years in command. This difference was noticed most readily in the reported retention figures. Some newer commanders stated that they had insufficient time in the job to assess a retention rate. However, most commanders surveyed appeared to have reported gross retention rates since their change of command. As such, the retention figures reported may more closely resemble the simple retention rate (SRR) than the more widely used cumulative retention rate (CCR).

Statistical analysis of the multiple choice questions was accomplished using the Statistical Package for the Social Sciences (SPSS) program. Routines used included the t-test for comparison of means(28:267-71), chi-square test of statistical significance for systematic relationships(28:223-4), and Pearson's r for measuring strength of linear relationship (correlation) between two

variables(28:279).

Differences in Environment and Perceptions

The Student's t statistic was used to determine if there was a significant difference between the MAJCOMs in the mean response to each question.(14:240-1;28:267-71) A two sample t -test was done on questions 153-166 and 174-185. A 95 percent confidence level was used initially, and a 90 percent confidence level was also reviewed to see what questions might have less significant differences between mean responses. The significant differences in responses are summarized in Table 4.

In comparing MAC to both other MAJCOMs, 12 questions appeared significant initially (153, 154, 155, 156, 157, 158, 159, 162, 163, 174, 175, and 184). MAC squadrons have more enlisted personnel than SAC or TAC; more officers than TAC, but less than SAC; and more crews than SAC. MAC squadrons are most apt to send their crews individually TDY on a particular mission, rather than in groups or as a unit; and the crews are gone TDY more. MAC squadron commanders also have a larger span of control than either SAC or TAC. MAC commanders did not feel as strongly that they spent too much time at staff meetings and briefings, but they did feel much more strongly that they spent too much time on officer effectiveness reports (OERs), airman performance reports (APRs), decoration recommendations, and nomination packages. In comparison to TAC, they felt more comfortable about the amount of time they spent on other staff work. They also

SIGNIFICANT DIFFERENCE IN RESPONSES BETWEEN MAJCOMs

<u>Question</u>	<u>MAC/SAC & TAC*</u>	<u>MAC/SAC</u>	<u>MAC/TAC</u>	<u>SAC/TAC</u>
153	X	XX		XX
154		XX	XX	XX
155	XX	XX	XX	
156	XX	XX	XX	XX
157	XX	XX	XX	
158	XX		XX	XX
159	XX	XX	X	XX
162	XX	XX	XX	
163			XX	
164		X		
165			X	
166			X	
174	XX	XX		
175	XX	X	XX	
176				X
180			X	
182	X		X	
183				XX
184	X		XX	X

*SAC and TAC observations merged for comparison to MAC

XX = 95% confidence level using Student's t-test

X = 90% confidence level using Student's t-test

Table 4

felt they had less personal knowledge about their subordinates and less time to counsel subordinates than SAC and TAC commanders. MAC commanders appeared to feel that they had too many other demands on their time to adequately handle their personnel responsibility. MAC commanders believed more strongly than TAC commanders that pilot retention was more a reflection of Air Force policies and civilian opportunities than a commander's leadership effectiveness. This difference could be a defensive reaction to the generally lower MAC retention rates.

Less significant differences (90 percent confidence level) appeared in five other questions (164, 165, 166, 180, and 182). MAC commanders were more comfortable with the amount of time spent on disciplinary actions. However, compared to TAC, they felt less comfortable with the amount of time spent in indirect supervision and flying activities. Also, they were less confident than TAC commanders that squadron commanders can influence pilot retention and that they were receiving adequate support from the chain of command in personnel issues and problems.

In comparing SAC to TAC, six questions were initially significant (153, 154, 156, 158, 159 and 183). SAC squadrons have fewer crews, more officers and the commanders have a larger span of control. SAC commanders are less satisfied with the amount of time spent in staff meetings/briefings, and agree more that a smaller squadron would allow them time to be a more effective commander.

Less significant differences were found in questions 176 and 184. TAC commanders were more positive that retention reflects their leadership effectiveness, while SAC commanders were more apt to believe that retention was more a reflection of Air Force policies and civilian opportunities. In this case, SAC has recently been more successful in pilot retention than TAC, so the difference does not appear to reflect a defensive reaction to declining retention rates.

Factors Related to Retention

The chi-square test was used to determine if there was a systematic relationship between the reported retention rates and responses to other questions. (3:112;28:223-4) A chi-square was computed for the reported retention rate (question 185) against questions 153-166 and 174-184. A 95 percent confidence level was again used initially, and a 90 percent confidence level reviewed to see what other questions might have a less robust relationship. A significant chi-square indicates a statistic probability that a relationship exists, but does not tell anything about the strength or direction of the relationship. (28:224)

Total Survey

The responses were first examined as a combined group, i.e., MAC, SAC and TAC together. Question 160 (time spent in personnel counselling) was initially the only factor with a significant relationship to retention. A less significant relationship was observed in questions 159 and

183, the amount of time spent in staff meetings/briefings and the commander's feelings about smaller squadrons yielding increased commander leadership effectiveness. The data were then broken down into MAJCOMs for analysis.

MAC

The MAC responses showed three questions with a significant relationship between retention and other factors (160, 164 and 165). The time spent for counselling, disciplinary actions, and indirect supervision all showed a systematic relationship to retention. Less significant relationships were observed between retention and the numbers of crews and officers per squadron, and the time available to work personnel issues (153, 154 and 178).

SAC

The chi-square analysis identified two questions in SAC with a significant relationship to retention. They were questions 155 and 162, the number of enlisted per squadron and the amount of time spent on OERs, APRs, etc. Less certain is a relationship between adequate support from the personnel system and retention (179).

TAC

The TAC commanders had five questions with a significant relationship to retention (156, 158, 161, 180 and 183). The span of control, how aircrews were sent TDY, and amount of time spent on commander's call all emerged as factors. Their feelings about commanders influencing retention and smaller squadrons allowing more commander

effectiveness also surfaced as possibly being related to retention.

Strength of Retention Related Factors

Pearson's r was used to test the strength and direction of the relationship (correlation) between retention rates and other questions. (5:56-61; 28:279-81) A Pearson's r was computed between the retention rates (question 185) and questions 153-166 and 174-184. A positive correlation indicates retention rates and answers to other questions move in the same direction. A negative correlation means they move in opposite directions. The 95 percent confidence level was initially specified for the test, and a 90 percent confidence level also surveyed to determine with less certainty the correlation between retention and other factors. A statistically significant correlation between variables will describe how they behave in relation to one another, but it will not necessarily state a cause and effect relationship. The correlation could reflect a third (unknown) factor affecting both variables. (5:63) However, correlation analysis could be used to predict a movement in one variable if another significantly correlated variable is changed. (28:279)

Total Survey

The data were first examined as a whole (MAC, SAC and TAC together). Three questions showed a significant correlation to retention (176, 183 and 184). There was an overall positive correlation between how strongly the

commanders agreed that retention reflected their leadership effectiveness and their pilot retention. There was a negative correlation between both the strength of their belief that smaller squadrons would increase their leadership effectiveness and that retention reflects Air Force policies more than their leadership effectiveness, and the reported retention rates. In other words, the worse the retention rate, the stronger were the beliefs that smaller squadrons would help and that retention reflected Air Force policies vice their personal leadership. This could also reflect a rationalization of the retention problems.

Less significant correlations were observed with questions 156 and 175. Span of control and retention were negatively correlated; that is, retention fell when the commanders directly supervised more people. The time available to counsel subordinates was positively correlated to retention; more time spent with the people raised retention.

MAC

An analysis of the MAC commanders' responses showed no statistically significant correlation between their retention rates and answers to other questions. The trends were similar to the group as a whole, but no question met the criteria for statistical significance.

SAC

The SAC commanders had one question that appeared significant on the first pass (176). Their feelings about

retention reflecting their leadership effectiveness was positively correlated to their retention rate. A less significant correlation was observed for five other questions (156, 175, 177, 180 and 183). There were positive correlations between their span of control and time available to counsel subordinates, and their retention rates. The strength of their beliefs about the number of people assigned determining their workload, and a smaller squadron allowing more commander leadership effectiveness were negatively correlated with retention. Finally, the strength of their feelings about their ability to influence retention was positively correlated to retention.

TAC

TAC commanders had two significant correlations to retention (156 and 176). Their span of control was negatively correlated, while the strength of their belief that retention reflects their leadership effectiveness was positively correlated to retention. A less significant negative correlation emerged between their feelings about a smaller squadron allowing them more effectiveness and retention (question 183).

Influence of Factors on Retention

Multiple regression analysis was used to determine exactly how the variables were related to retention. (5:61-66,68-71; 28:323-335) This procedure can generally be used for two purposes: estimation of most likely parameters, i.e., which variables can be used to best

predict a value for the dependent variable (in this case, retention); and evaluation of a hypothesis, i.e., is the retention rate inversely proportional to squadron size? (28:332) The general form of the resultant regression equation is

$$Y = A + B_1 X_1 + B_2 X_2 + \dots + B_k X_k$$

where

Y = retention rate,

A = constant added to each case,

B = regression coefficient for a particular question (the expected change in Y for one unit change in X when all other variables are held constant), and

X = value of a particular question (variable).

(28:328,330)

A multiple regression analysis was conducted using question 185, pilot retention rate, as the dependent variable; and questions 153-166 and 174-184 as the independent variables. The 95 percent confidence level was initially used in the analysis, and a 90 percent confidence level was also reviewed to determine what other less significant relationships might emerge. The square of the multiple regression coefficient (R) was used to estimate what percentage of the observed retention rate change could be attributed to changes in the significant independent variables. (28:330)

Total Survey

The data were first examined for the combined group

of all surveyed MAJCOMs (MAC, SAC and TAC). Three questions (176, 182 and 183) emerged as significant. The regression equation was

$$(Q185) = 8.50910 + .81465(Q176) - .45496(Q182) - .55548(Q183)$$

where differences in the responses to questions 176, 182 and 183 accounted for over 15 percent of the changes in the retention rate. This indicates that the more a commander believes that retention is a reflection of his leadership effectiveness, the higher his pilot retention rate will be. However, the strength of the commander's agreement that he has adequate support from the chain of command in personnel issues, and that smaller squadrons would allow time to be a more effective commander tend to be inversely proportional to pilot retention rates. Stated another way, as retention dropped, commanders tended to want smaller squadrons, but felt stronger that the chain of command supported them. When retention lags, everyone tries hard, but it is perceived as an Air Force, not personal leadership or support, problem.

At a 90 percent confidence level, no other factors appeared significant with these three questions in the equation. However, if question 183 is dropped, question 156 becomes significant. In other words, if the commander's feeling about smaller squadrons is ignored, span of control becomes a significant factor. The larger the span of control, the lower the observed retention rate becomes.

MAC

The regression analysis of the MAC commanders' responses alone yielded no statistically significant relationships. Various combinations of questions were all below the cutoff level. This is consistent with the lack of significant correlation found during the test for Pearson's r .

SAC

The SAC commanders had two questions (176 and 183) appear as significant in their regression analysis. The regression equation was

$$(Q185) = 6.52720 + 1.61170(Q176) - .95050(Q183)$$

where the variation in responses to questions 176 and 183 accounted for over 32 percent of the variation in the pilot retention rate. This indicates again that the more a commander believes that retention is a reflection of his leadership effectiveness, the higher the retention rate is. The less strongly a commander believes that a smaller squadron would allow him to be a more effective commander, the higher the pilot retention rate.

A regression analysis at the 90 percent confidence level yielded an interesting phenomenon. With all variables considered, no additional significant factors were identified. However, if just the demographic factors were used (questions 153-158), three questions emerged as significant (155, 156 and 157). The regression equation

$$(Q185) = 7.58855 - .83164(Q155) + .62717(Q156) - .96140(Q157)$$

accounted for over 26 percent of the variation in the pilot retention. This would indicate that the span of control was directly proportional to pilot retention, while the number of enlisted personnel per squadron and number of days TDY per month were inversely proportional to retention. The significance of this finding with just the demographic factors considered is unknown.

TAC

The TAC responses initially showed only one question as significant (156). The regression equation

$$(Q185) = 8.50480 - .28273(Q156)$$

accounted for almost nine percent of the retention variance. In other words, the smaller the span of control, the higher the pilot retention rate.

A review at the 90 percent confidence level added one more question (176) to the regression equation, so that it became

$$(Q185) = 6.99361 - .28949(Q156) + .60710(Q176)$$

and accounted for over 14 percent of the pilot retention variation. The span of control remained negatively proportional to retention, while the strength of belief that retention reflects a commander's leadership effectiveness was directly proportional to retention. When considering only the demographic variables, the span of control (156) was identified as significant. If only questions 174-184 were included in the consideration, the belief that a smaller squadron would increase leadership effectiveness

(183) was inversely proportional to retention.

A summary of the questions and their observed statistical relationship to pilot retention using the tests for chi-square and Pearson's r , and regression analysis is presented in Table 5. This information will be used to draw conclusions in Chapter VI.

Reasons for Separation

Questions 168-173 dealt with the squadron commander's perception about why pilots were separating from the Air Force. The most often cited reasons from previous studies (see Chapter III) were used as choices. The results were tabulated by ordinal rank.

Of particular interest was the family/spouse consideration. While it was rather low for all groups as a primary reason for separation, it was the most frequent factor cited as the second and third reasons for separations by the group as a whole. Perhaps retention efforts should focus more closely on tending to the needs of the families if the Air Force intends to increase pilot retention.

The commanders' perception of their impact on the reasons for separation were relatively uniform across the MAJCOMs. For instance, the majority of commanders felt they had no impact on geographic stability, financial considerations, and "other" factors. They felt they had little control over job satisfaction, future assignments, irregular work hours/erratic schedules, and family/spouse considerations. They felt they had little to moderate

RETENTION RELATED FACTORS

Question	All MAJCOMs	MAC	SAC	TAC
153		X		
154		X		
155			XX	
156	r(-)		r(+)	XX rr(-) RR(-)
158				XX rr(-)
159	X			
160	XX	XX		
161				XX
162			XX	
164		XX		
165		XX		
175	r(+)		r(+)	
176	rr(+) RR(+)		rr(+) RR(+)	rr(+) R(+)
177			r(-)	
178		X		
179			X	
180			r(+)	XX
182	RR(-)			
183	X rr(-) RR(-)		r(-) RR(-)	XX r(-)
184	rr(-)			

X = chi square (systematically related to retention)

r = Pearson's r (correlated to retention in positive[+] or negative[-] manner)

R = Multiple regression coefficient (significant variation in retention described by changes in the response to this question when all questions considered together)

Note: double letter (i.e., XX) indicates 95% confidence level

single letter (i.e., X) indicates 90% confidence level

Table 5

control over only job opportunity and non-flying requirements. See Table 6 for a summary of why pilots separate.

Survey Narrative Comments

Questions 186-190 asked the commanders for their ideas on what they would like to see changed or wished they had time to do to increase their leadership effectiveness and/or pilot retention. The answers tended to center around two main themes. The commanders want to fly more with their squadron personnel and spend more time talking to their people.

Over two-thirds of the commanders indicated that they did not fly enough with their crews. The perceived benefits of more flying included a stronger role model, better communication upward and downward, and increased understanding of what was actually happening in the squadron. The commanders also wanted more time to work directly with members of their squadron. In addition to the reasons cited for flying more, many commanders referred to "management by wandering around" as popularized by Peters and Waterman in In Search of Excellence. The common thread was that there was just not enough time to do everything they would like to do as commanders.

Approximately 20 percent of the commanders indicated that they wished they had more "commander training" before assuming their command. Military justice, quality force issues and budgeting were all mentioned. Many felt that

SQUADRON COMMANDER PERCEPTIONS ABOUT WHY PILOTS SEPARATE

	MAC(#)			SAC(#)			TAC(#)			TOTAL SURVEY(#)		
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>
Job Opportunities	1	2	4*	1.5*	8.5*	6	2	1.5*	2	1.5*	3	3*
Financial	2	3.5*	2	1.5*	4.5*	3	1	3.5*	6	1.5*	4.5*	5
Other(+)	3	8.5*	4*	3	3	8.5*	5	6	9	3	6	7.5*
Control of Assignments	8.5*	3.5*	7	5*	4.5*	1	3	1.5*	3	4	2	3*
Family/Spouse	8.5	1	1	5*	1.5*	4.5*	4	5	1	5	1	1
Non-flying Requirements	4	5	4*	8*	1.5*	2	6.5*	3.5*	4	6	4.5*	3*
Job Satisfaction	6	8.5*	8.5*	5*	6	7	6.5*	8.5*	8	7	8*	9
Work Hours/ Erratic Schedule	5	6.5*	8.5*	8*	7	4.5*	9	8.5*	7	8	8*	7.5*
Geographic Stability	7	6.5*	6	8*	8.5*	8.5*	8	7	5	9	8*	6

(#) Rank order given for the primary/secondary/tertiary reasons for separating from the Air Force.

(*) Tied for ordinal rank.

(+) Most common reasons cited were a combination of other factors above, the airlines hiring, a perception that pilots cannot just fly and get promoted, and additional duties (in that order).

Table 6

they were not "up to speed" on current MAJCOM issues and policies when starting out. A formal commander indoctrination program, preferably with spouses, should go a long way in filling this gap.

These responses highlight some interesting points. There are common threads between MAJCOMs, and some major differences. Taken together, the data point to some conclusions about leadership, squadron size, and retention.

CHAPTER VI

CONCLUSIONS

In the final analysis, what does it all mean? The individual responses to 38 questions by 151 squadron commanders have been tabulated, compared, correlated and crunched. What does it tell us about pilot retention?

Hypothesis Testing

The working hypothesis was that squadron commander leadership effectiveness, as measured by pilot retention, is inversely proportional to squadron size. Within the demographic factors, only the span of control (156) was found to be significantly related to pilot retention. Overall, and within TAC in particular, the span of control was inversely proportional to retention. However, SAC demonstrated a positive correlation between span of control and retention. The statistical analysis of the demographic data did not conclusively support the hypothesis.

Focusing on the commanders' perceptions of their job and the environment they operate in (174-184), five questions appeared significantly correlated (175, 176, 182, 183, and 184), with three of them (176, 182 and 183) emerging as significant factors in the regression analysis. The perceived time available to counsel subordinates and the link between their leadership effectiveness and retention

rates were both positively correlated to retention. However, the more perceived support from the chain of command, and the more they favorably viewed a smaller squadron, the lower was the retention rate. Conversely, the commanders with the lowest retention rates believed most strongly that smaller squadrons would help them become more effective, and that they were receiving adequate support from the chain of command. The commanders with lower retention rates generally believed that retention reflected Air Force policies more than their own personal influence. The statistical analysis of commanders' perceptions offered limited support for the hypothesis.

On balance, there is no clear cut statistical relationship between retention rate and the existing size of the squadron for either the group as a whole or for any particular MAJCOM. Therefore, the hypothesis that retention is inversely proportional to squadron size cannot be statistically proven by this study and must be rejected. However, some interesting observations are available from the study to generalize to the population.

Other Conclusions

Considering first the span of control for squadron commanders, the data indicate that retention could be increased by decreasing the number of people reporting directly to the commander. Although the less significant opposite correlation in SAC cannot be explained, the overall impact on retention should be positive.

There is evidence that providing more time for personnel counselling should positively impact upon pilot retention. The narrative comments of the squadron commanders also bear this out. Assuming that the squadron commanders are already fully employed, this means eliminating some existing time demands on the commanders. The survey indicates that most commanders feel they are spending an excessive amount of time on paperwork. The new officer evaluation system promises to reduce some of the OER associated paperwork (eliminating the front side comments and the requirement to draft recommended elevated indorsements and justifications). The move to provide more administrative support for the squadrons is encouraging. Full time administration or operations systems management officers for each squadron would help tremendously. The new OES required counsellings will also help.

The attitude of the squadron commanders towards their impact on retention is important. Those commanders with higher retention rates tend to believe it reflects their leadership effectiveness, while those with lower rates tend to view retention as the result of Air Force policies and civilian opportunities. There is no proof of a cause-and-effect relationship either way, but better prepared and informed commanders should be able to work the thorny pilot retention issues more effectively. As noted in the commanders' narrative remarks, many felt that they were not adequately prepared for some aspects of their new job.

The Air Force trains other officers before placing them in a new job. Why not do the same for squadron commanders? Attendance of a commander's orientation/training course prior to change of command would better prepare them to handle some of the unique aspects of their new job and could update them on the latest retention issues and Air Force or MAJCOM initiatives. The extra knowledge could take the mystery out of some quality force policies or military justice actions, for instance, and allow more time and knowledge to work personnel issues and problems.

The family appears to play a larger role in the decision to separate than previously appreciated. This survey determined that family/spouse considerations were the most commonly cited secondary and tertiary reasons for leaving the Air Force. When commanders are developing retention strategies for their squadrons, the impact of the family must be considered.

Finally, the belief by commanders with lower retention rates that a smaller squadron would allow more time to be more effective may be significant by itself. Smaller squadrons, especially in MAC and SAC, could allow the commander more time to work one-on-one with subordinates. Smaller squadrons would also provide more job opportunities, i.e., more commanders, operations officers, etc. This alone could be important, since job opportunities were cited as the first or second most common reason for separating from the Air Force by the commanders in this

survey (see Table 6). MAC has tried this concept at Charleston AFB and is reviewing the feasibility of reducing the flying squadron size at other bases. The objective is "to improve the flying squadron commander's span of control" and "create more effective and efficient squadrons." (1:1) Span of control was previously found to be inversely proportional to retention, i.e., retention went up as the number of people supervised went down. In a notional strategic airlift squadron, for example, the additional manpower would be 15-19 positions to create an additional squadron at a base. (1:H-II-1,2) Although it is still too early to judge the effects of this initiative, it demonstrates that it can be done, even in a fiscally constrained environment. Even though there is not a statistically strong direct relationship between retention and squadron size alone, the combination of a reduced commander workload, smaller span of control, and increased job opportunities may well make smaller squadrons an effective step in addressing pilot retention.

These conclusions represent generalizations about leadership, retention, and squadron organization. From them, recommendations for specific action can be drawn.

CHAPTER VII

RECOMMENDATIONS

The data from this survey and the conclusions in Chapter VI suggest that time and knowledge are the limiting factors for squadron commanders in dealing with pilot retention issues and problems. The following recommendations are made to increase the squadron commander's leadership effectiveness and improve pilot retention.

1. Make attendance at a commander orientation/training course mandatory prior to change of command.
2. Assign an administration or operations systems management officer to each flying squadron.
3. Decrease the number of people directly reporting to the squadron commander.
4. Where feasible, decrease squadron size and increase job opportunities by increasing the total number of squadrons for a given weapon system.

ANNEX A

FLYING SQUADRON COMMANDER SURVEY

INSTRUCTIONS: These questions apply to your experiences as a flying squadron commander. Please answer questions on the survey or on the attached AU Form 4, where applicable. Note that the answers should start in the right column of the AU Form 4.

153. How many crews is your squadron authorized?

- | | |
|-----------------|----------------------|
| a. 20 or less | |
| b. 21-25 | |
| c. 26-30 | (actual number_____) |
| d. 31-35 | |
| e. more than 35 | |

154. How many officers are normally assigned to your squadron?

- | | |
|---------------|------------------|
| a. 20 or less | f. 81-95 |
| b. 21-35 | g. 96-110 |
| c. 36-50 | h. 111-125 |
| d. 51-65 | i. 126-140 |
| e. 66-80 | j. more than 140 |
- (actual number_____)

155. How many enlisted personnel are normally assigned to your squadron?

- | | |
|---------------|------------------|
| a. 20 or less | f. 81-95 |
| b. 21-35 | g. 96-110 |
| c. 36-50 | h. 111-125 |
| d. 51-65 | i. 126-140 |
| e. 66-80 | j. more than 140 |
- (actual number_____)

156. How many people do you directly supervise?

- | | |
|--------------|---------------|
| a. 5 or less | f. 10 |
| b. 6 | g. 11 |
| c. 7 | h. 12 |
| d. 8 | i. 13 |
| e. 9 | j. 14 or more |
- (actual number_____)

157. On the average, how many days per month are the aircrews TDY in your squadron?

- a. less than 5
- b. 6-8
- c. 9-11
- d. 12-14
- e. 15 or more

158. How do you usually send your aircrews TDY?

- a. individually (on a particular mission)
- b. in groups (for an exercise, etc.)
- c. as a unit (rotation overseas, etc.)
- d. other (please specify_____)

The next questions are to determine how much of your time various duties consume. Please estimate the amount of time in an average week you spend in various activities using the following scale.

	a	b	c	d	e
	I-----I	I-----I	I-----I	I-----I	I-----I
	not nearly enough time	not enough	about right	too much	far too much time
159. Staff meetings/briefings				-----	
160. Personnel counselling				-----	
161. Commander's calls, etc.				-----	
162. OERs, APRs, decoration recommendations, nomination packages, etc.				-----	
163. Other staff work				-----	
164. Disciplinary action				-----	
165. Indirect supervision				-----	
166. Flying (mission planning, flying, crew rest)				-----	
167. Other (please specify) _____				-----	

For questions 168-170, please use the following list.

As you see it, what are the three biggest reasons for pilots separating from the Air Force?

- a. Job satisfaction
- b. Geographic stability
- c. Little say in future assignments
- d. Job opportunity(uncertainty about continued flying jobs, etc)
- e. Financial
- f. Irregular work hours, short notice TDYs, etc.
- g. Family/spouse considerations
- h. Non-flying requirements(PME, advanced degree, career broadening, etc)
- i. Other (please specify) _____

(Please select different answers for first, second and third reasons.)

168. Primary (most common) reason -----

169. Secondary reason -----

170. Tertiary reason -----

How much impact do you have on each factor identified above?

a	b	c	d	e
I-----I	I-----I	I-----I	I-----I	I-----I
no	little	moderate	much	total
control	control	control	control	control

171. Impact I have on the primary reason. -----

172. Impact I have on the secondary reason. -----

173. Impact I have on the tertiary reason. -----

Please answer questions 174-184 using this scale:

a	b	c	d	e
I-----I	I-----I	I-----I	I-----I	I-----I
strongly	disagree	neither	agree	strongly
disagree		agree nor		agree
		disagree		

174. As a squadron commander, I have personal knowledge of each squadron member's performance, ambitions, and limitations. -----

175. I have time to regularly counsel all my subordinates. -----

a	b	c	d	e
I-----I	I-----I	I-----I	I-----I	I-----I
strongly disagree	disagree	neither agree nor disagree	agree	strongly agree

176. Retention is a reflection of a squadron commander's leadership effectiveness.

177. The number of personnel assigned to a squadron is an important factor in determining a commander's workload.

178. I have adequate time available to effectively work my squadron's personnel issues/problems.

179. I have adequate support and data from the personnel system to effectively work my squadron's personnel issues/problems.

180. Squadron commanders can significantly influence pilot retention.

181. Considering our mission and environment, my squadron is just about the right size for a commander to really maximize his/her leadership effectiveness.

182. I have adequate support from the chain of command to effectively work my squadron's personnel issues/problems.

183. A smaller squadron would allow me the time to be a more effective commander.

184. Retention is more a reflection of Air Force policies and civilian opportunities than a squadron commanders's leadership effectiveness.

185. Within your squadron, what percent of the pilots eligible for separation did you retain?

- | | |
|-----------|------------|
| a. 0-10% | f. 51-60% |
| b. 11-20% | g. 61-70% |
| c. 21-30% | h. 71-80% |
| d. 31-40% | i. 81-90% |
| e. 41-50% | j. 91-100% |

186. What one thing would you like to see changed about your squadron in order to enhance your effectiveness as a commander?

187. As a commander, I wish I had more time to:

188. What do you feel would enhance leadership effectiveness within your squadron?

189. If you had the time to do it, what one thing could you do that would have the greatest positive impact on retention of captains in your unit?

190. What other comments/suggestions/recommendations do you have about enhancing squadron commander leadership effectiveness?

Thanks for your time and candor in completing this survey.

PLEASE RETURN COMPLETED SURVEY IN THE ENVELOPE PROVIDED.

APPENDIX B

SUMMARY OF SURVEY RESPONSES

219 surveys were mailed to flying squadron commanders and 151 responses were received in time to process for this report. The breakdown was as follows:

	<u>mailed</u>	<u>returned</u>	<u>response rate</u>
MAC	59	46	78%
SAC	73	43	59%
TAC	85	62	73%
TOTAL	217	151	70%

The frequency count of responses and mean ($\bar{x}$), where appropriate, for each question is indicated below. When the total number of responses is less than 151, it indicates some commanders did not respond to this question.

153.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	16	2	7	14	7					2.870
SAC	26	10	0	3	3					1.738
TAC	18	7	12	13	12					2.903
TOTAL	60	19	19	30	22					2.567

154.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(10) <u>j</u>	(mean) <u>x</u>
MAC	3	4	6	4	12	10	4	3	0	0	4.717
SAC	1	1	3	4	12	7	3	3	3	5	6.000
TAC	9	24	13	4	5	5	0	0	0	2	3.016
TOTAL	13	29	22	12	29	22	7	6	3	7	4.373

155.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(10) <u>j</u>	(mean) <u>x</u>
MAC	3	6	4	5	3	7	0	3	6	9	5.913
SAC	9	25	4	1	2	1	0	0	0	0	2.167
TAC	43	6	2	0	1	1	1	0	1	6	2.426
TOTAL	55	37	10	6	6	9	1	3	7	15	3.430

156.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(10) <u>j</u>	(mean) <u>x</u>
MAC	1	1	6	6	2	7	2	1	1	19	6.913
SAC	2	3	5	11	6	5	3	2	1	5	5.186
TAC	37	6	7	4	0	2	1	0	1	4	2.484
TOTAL	40	10	18	21	8	14	6	3	3	28	4.603

157.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	13	11	11	7	4					2.522
SAC	20	15	4	2	2					1.861
TAC	38	14	7	1	2					1.629
TOTAL	71	40	22	10	8					1.967

158.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	37	7	0	2	0					1.283
SAC	30	9	0	4	0					1.488
TAC	12	43	1	6	0					2.016
TOTAL	79	59	1	12	0					1.642

159.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	2	24	15	5					3.500
SAC	0	0	6	26	11					4.117
TAC	0	0	23	31	8					3.758
TOTAL	0	2	53	72	24					3.782

160.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	2	17	25	1	1					2.609
SAC	0	19	24	0	0					2.558
TAC	1	19	41	0	0					2.656
TOTAL	3	55	90	1	1					2.613

161.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	8	36	2	0					2.870
SAC	1	5	37	0	0					2.837
TAC	1	8	50	2	1					2.903
TOTAL	2	21	123	4	1					2.874

162.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	0	5	16	25					4.435
SAC	0	2	13	13	15					3.954
TAC	0	0	15	41	6					3.855
TOTAL	0	2	33	70	46					4.060

163.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	2	25	16	2					3.400
SAC	0	6	17	14	6					3.466
TAC	0	2	20	35	5					3.694
TOTAL	0	10	62	65	13					3.540

164.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	2	41	3	0					3.022
SAC	0	1	35	5	2					3.186
TAC	0	0	56	6	0					3.097
TOTAL	0	3	132	14	2					3.099

165.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	2	9	30	5	0					2.826
SAC	1	7	29	5	1					2.954
TAC	0	11	38	11	2					3.065
TOTAL	3	27	97	21	3					2.960

166.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	11	28	6	1	0					1.935
SAC	12	21	10	0	0					1.954
TAC	7	39	15	1	0					2.161
TOTAL	30	88	31	2	0					2.033

167.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	3	1	8	3	3					3.111
SAC	2	1	8	5	3					3.316
TAC	0	3	5	6	6					3.750
TOTAL	5	5	21	14	12					3.404

168.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	3	2	1	11	10	4	1	6	8
SAC	3	1	3	12	12	1	3	1	7
TAC	5	1	11	12	13	0	9	5	6
TOTAL	11	4	15	35	35	5	13	12	21

169.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	1	2	8	9	8	2	10	5	1
SAC	4	2	5	2	5	3	8	8	6
TAC	1	2	13	13	10	1	9	10	3
TOTAL	6	6	26	24	23	6	27	23	10

170.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	1	5	4	6	8	1	9	6	6
SAC	3	2	8	4	6	5	5	7	2
TAC	2	7	9	11	5	3	16	8	1
TOTAL	6	14	21	21	19	9	30	21	9

171.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	26	15	5	0	0				
SAC	24	15	3	1	0				
TAC	23	24	13	2	0				
TOTAL	73	54	21	3	0				

172.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	21	10	12	3	0				
SAC	16	23	4	0	0				
TAC	25	22	11	4	0				
TOTAL	62	55	27	7	0				

173.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>
MAC	21	21	3	1	0				
SAC	15	18	9	0	1				
TAC	18	27	17	0	0				
TOTAL	54	66	29	1	1				

174.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	2	7	5	24	8					3.630
SAC	1	3	3	21	15					4.070
TAC	3	5	4	30	20					3.952
TOTAL	6	15	12	75	43					3.887

175.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	5	25	4	9	3					2.565
SAC	5	14	3	18	3					3.000
TAC	6	19	6	25	6					3.097
TOTAL	16	58	13	52	12					2.907

176.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	12	18	11	5	0					2.196
SAC	12	17	10	4	0					2.140
TAC	11	21	14	14	0					2.500
TOTAL	35	58	35	23	0					2.305

177.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	1	5	8	21	11					3.783
SAC	3	7	5	18	10					3.581
TAC	1	7	19	27	8					3.548
TOTAL	5	19	32	66	29					3.629

178.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	2	14	8	20	2					3.130
SAC	3	20	5	14	1					2.767
TAC	3	15	21	23	0					3.032
TOTAL	8	49	34	57	3					2.987

179.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	4	16	3	21	2					3.022
SAC	4	13	8	17	1					2.954
TAC	7	24	13	18	0					2.677
TOTAL	15	53	24	56	3					2.861

180.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	2	19	8	15	2					2.913
SAC	3	15	9	11	5					3.000
TAC	2	12	18	29	1					3.242
TOTAL	7	46	35	55	8					3.073

181.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	1	11	8	22	4					3.370
SAC	4	4	10	18	6					3.429
TAC	3	6	11	33	9					3.630
TOTAL	8	21	29	73	19					3.493

182.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	3	14	4	22	3					3.174
SAC	1	10	6	20	6					3.465
TAC	2	9	11	35	5					3.516
TOTAL	6	33	21	77	14					3.397

183.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	4	23	9	6	4					2.630
SAC	4	17	8	11	3					2.814
TAC	11	26	17	6	2					2.387
TOTAL	19	66	34	23	9					2.583

184.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(mean) <u>x</u>
MAC	0	0	4	21	21					4.370
SAC	0	3	3	16	21					4.280
TAC	0	4	12	28	18					3.968
TOTAL	0	7	19	65	60					4.179

185.	(1) <u>a</u>	(2) <u>b</u>	(3) <u>c</u>	(4) <u>d</u>	(5) <u>e</u>	(6) <u>f</u>	(7) <u>g</u>	(8) <u>h</u>	(9) <u>i</u>	(10) <u>j</u>	(mean) <u>x</u>
MAC	2	1	2	5	5	1	5	3	4	11	6.821
SAC	4	1	1	1	3	1	3	5	8	12	7.360
TAC	1	5	1	2	4	1	4	8	16	18	7.733
TOTAL	7	7	4	8	12	3	12	16	28	41	7.370

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