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# INDICATORS OF INDISCIPLINE PHASE 2

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August 31, 1991

Contract No. DAAJ09-88-D-A002

*Prepared for:*

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## INDICATORS OF INDISCIPLINE, PHASE 2

### EXECUTIVE SUMMARY

#### Requirement:

Phase 1 of the indicators of indiscipline study, (reference 1), consisted of a literature review of journal articles and technical reports dealing with human-error accidents, a review of motivational factors which may influence inadequate self-discipline, and the cross-referencing of Army recruitment file data with certain findings from the literature review. As a result of this research, a list of 20 indicators was identified which might be predictive of undisciplined behavior in soldiers.

Phase 2 research was conducted to determine which of the indicators identified by the phase 1 study could successfully identify soldiers who cause accidents due to indiscipline and to field test a motivational management system to determine its ability to increase self-discipline and performance to standards.

#### Procedures:

A search was conducted to identify computerized data bases which contained information on soldiers that related to one of the 20 indicators of indiscipline identified in phase 1. After the specific data elements that were needed from each of these data bases were determined, coordination to obtain the data was effected with each of the owning organizations. Once the data were received from the various sources, the variables from the different data bases were collected to form two data bases -- a non-aviation accident data set and an aviation accident data set. Specific procedures pertaining to the order in which the variables would be entered, the identification of dichotomous variables, and the order in which the data bases would be entered were developed to obtain accident and non-accident groups of individuals for both the non-aviation and aviation data sets.

Descriptive statistical procedures were conducted to obtain an overall look at the data distributions of the categorical and continuous variables. Certain variables within the data bases were manipulated to create new variables, and an inferential statistical procedure was conducted to establish which variables would best predict which personnel, in either data set, would most likely be involved in accidents.

A systematic review of 484 Class A-C Army aviation accidents attributed to human error was conducted by subject matter experts to: identify human errors due wholly or partly to indiscipline; match these errors to a preliminary list of high-risk behaviors provided by the U.S. Army Safety Center (USASC); refine the description of the preliminary list of high-risk behaviors to more accurately describe the behavior existing in the accident report; and compile a final, prioritized list of the most frequently occurring high-risk behaviors for subsequent field testing.

A review of Army Regulations (ARs) was conducted to determine the administrative actions presently available to commanders to preclude high-risk behavior. A questionnaire was developed to survey Army aviators about their personal experiences with high-risk behavior, using the prioritized list of high-risk behaviors developed from the systematic review of accident cases. Two candidate risk management techniques were developed for implementation in aviation units. A brief survey was conducted to assess the willingness of aviation unit commanders and Army aviators to implement or support the two techniques within their units.

### Findings:

Ten agencies controlling 12 data bases which could support the study were identified. Data were received from eight data bases owned or controlled by six different organizations. The data bases contained information on individuals relevant to 11 of the 20 indicators of indiscipline identified by phase 1. Initial frequency distributions for the aviation accident data set indicated that many of the data fields were poorly managed, which made matching among the data bases and construction of the data sets nearly impossible. Additionally, the number of matches between these data bases and the at-fault accident personnel was too low to allow appropriate analyses. As a result, the analysis of aviation accidents was abandoned.

The initial frequency distributions for the non-aviation data set showed that the officer and National Guard/Reserve tapes contained no valid entries. This problem restricted the analysis to enlisted personnel only. Approximately 11,000 matches between enlisted personnel in the data set and the accident data base were identified. Correlations among the variables were run, and although well over half of the variables correlated significantly (none higher than 0.10), the individual variables explained so little of the outcome (i.e., whether a person would be involved in an accident), that they were unusable. Because of the low correlations between predictors and accident involvement and because data limitations did not permit multivariate analyses, a discriminant analysis was not performed.

Review of the human-error accidents revealed that high-risk behavior was involved in over 20 percent of the accident cases in the data sample, with approximately half of those involving flagrant violations of regulations or procedures. The most commonly occurring type of high-risk behavior involved unauthorized aerobatics, return-to-target maneuvers, or "buzzing" ground vehicles. Results of the questionnaire to determine the high-risk behavior baseline for unit aviators indicated that the most frequently occurring high-risk behavior was associated with improper performance planning, exceeding crew endurance, or improperly documenting hazard maps. According to the accident data, improper performance planning was the only high-risk behavior in the top five.

Accidents resulting from high-risk behavior are a significant problem in Army aviation. Previous attempts to reduce this problem through increased emphasis on personal accountability and the use of negative enforcement programs have been largely unsuccessful. Information pertaining to the specific types of high-risk behavior, the severity of

accidents resulting from this behavior, and methods to alleviate the problems have not been readily available to the aviation community. Two high risk behavior management techniques were developed for implementation within aviation units -- education and reinforcement/enforcement.

#### Utilization:

Recommended changes are proposed to improve the accident investigation process by modifying the data collection effort to include specific inquiries and appropriate background information on all individuals involved in Army accidents. This would provide the necessary information on accident and non-accident groups pertaining to all 20 indicators of indiscipline. Furthermore, the 3W taxonomy used by accident investigators should be modified to delete "inadequate attention" as a system cause for human error.

Recommendations are also proposed to institute the education and reinforcement/enforcement techniques for combating high-risk behavior committed by air crewmembers. Additionally, if further data are needed to establish a baseline for high-risk behavior in Army aviation, the refined survey (appendix I) should be administered to a larger sample of Army aviation personnel.

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## INTRODUCTION

USASC statistics have shown that, since 1980, human error has been a causal factor in approximately 80 percent of Army accidents. The largest single category of human error accidents is comprised of those due to indiscipline. Indiscipline, as defined by the USASC, refers to errors caused by inadequate composure, inattention, overconfidence or lack of confidence, improper attitude or motivation, self-induced fatigue, and alcohol or drug abuse. A two-phase study was undertaken to identify indicators of indiscipline and to determine how these indicators might be used to improve Army safety.

Phase 1 of the indicators of indiscipline study, completed in 1991, consisted of a literature review of journal articles and technical reports dealing with human-error accidents, a review of motivational factors which might influence inadequate self-discipline, and the cross-referencing of Army recruitment file data with certain findings from the literature review. As a result of this research, the phase 1 contractor identified a list of 20 indicators which might be predictive of undisciplined behavior in soldiers. These 20 indicators were related to demographic information, information that indicated involvement in some sort of civil offense or violation, and information pertaining to the social development of the individual.

This phase of the study was designed to accomplish two objectives -- to determine which of the indicators from phase 1 could successfully identify soldiers who cause accidents due to indiscipline and to test a motivational management system to determine its effectiveness in increasing self-discipline and performance to standards. These objectives are addressed separately in this report.

## PREDICTING INDISCIPLINE

### Data Base Search - Method

Results of phase 1, including the 20 indicators of indiscipline (table 1) identified by the phase 1 contractor, were reviewed to gain an understanding of each indicator and the supporting research. A search was conducted to identify computerized data bases which contained information on soldiers relating to any of the 20 indicators of indiscipline identified in phase 1.

The phase 1 report revealed six general categories and 20 specific sub-categories, titled the "Indicators of Indiscipline." The complete matrix which combines the recruitment file factors related to accidents and their associated studies is located in appendix A. Table 1 depicts the 20 indicators of indiscipline that deemed worthy of further research by phase 1:

| Table 1                                                                                                                                             |                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicators of Indiscipline from Phase 1                                                                                                             |                                                                                                                                                            |
| A. Driving Behavior<br>1. Previous Traffic Violations<br>2. Previous Accident History<br>3. Driving Experience<br>4. Type of Driver Training        | D. Social/Intellectual Achievement<br>10. Early Socialization/Parental Relations<br>11. IQ and Aptitude<br>12. Socioeconomic Status<br>13. Education Level |
| B. Military Service<br>5. Military Rank<br>6. Years of Military Service                                                                             | E. Demographics<br>14. Age<br>15. Age at Enlistment<br>16. Job Type and Level<br>17. Marital Status                                                        |
| C. Drug/Alcohol/Disciplinary/Crime Involvement<br>7. DUI, Alcohol, Drug Involvement<br>8. Non-traffic Disciplinary Offenses<br>9. Criminal Offenses | F. Life Events, Peers, Work History<br>18. History of Life Events and Changes<br>19. Negative Peer Relations<br>20. Uneven Work Record                     |

Three basic requirements were used to select potential data bases for the research. First, the data base needed to contain information on individuals relating to one or more of the 20 indicators of indiscipline. Second, the data base had to contain at least one personal identifier data field in common with the other data bases being used (e.g., name, social security account number (SSAN)), allowing researchers to retrieve selected data from various data bases to create a record for each individual included in the study. And third, the data base had to be accessible at little or no cost.

The preliminary data search began with the Dialog Information Retrieval System, file number 230, Computer-Readable Data Bases. This file contains detailed descriptions of

approximately 4,200 publicly available data bases accessible through an on-line vendor or batch processor or available for direct lease, license, or purchase on CD-ROM, diskette, magnetic tape, or other recording or storage medium. Because of the public access, data bases listed in Dialog did not contain personal individual information such as SSAN necessary to support the study. In fact, no data base with public access proved useful.

Efforts then focused on the U.S. Army Recruiting Command and local law enforcement agencies and eventually expanded to include several other Federal agencies. Further data base searches concentrated primarily on Federal, State, and local government agencies and other agencies within the Department of Defense (DOD) and the Department of the Army (DA). It was necessary to determine the particular information in the data bases, the process of obtaining access to the data, and the specific data elements that were needed from each of these data bases. Finally, with USASC assistance, coordination was effected to obtain the desired data from each of the owning organizations. All requests for data to these agencies described the research for which the data would be used, specified a format was compatible with USASC computer hardware, requested a record layout of the data, and requested data from a 5-year period from January 1985 through the most current data available (unless otherwise specified).

### Data Base Search - Results

Ten agencies controlling 12 data bases which contained data sufficient to support the study were identified. A summary of each data base and its availability/accessibility follows:

#### Defense Manpower Data Center (DMDC)

The Active Duty Military Master and Loss Edit data base from the DMDC contains records for all military personnel who are, or were, on active duty for 180 days or more. Files in the data base are created by the U.S. Army Recruiting Command during the service-member's (SMs) accession into the Army. Each individual data file is periodically updated for as long as the SM remains on active duty. A similar file, albeit with slightly different fields and update procedures unique to their status, is maintained on Reserve Component and National Guard personnel. A 10-year period of time, October 1979 through the most current 1990 data, was selected.

The following fields of information were selected from the Active Duty Military Master and Loss Edit data base. (The fields provide either identification data used to match personnel data found in other data bases or actual information on the SM relating to one or more of the 20 indicators of indiscipline.)

- |                                                                     |                                                   |
|---------------------------------------------------------------------|---------------------------------------------------|
| 1. SSAN                                                             | 11. Ethnic Group                                  |
| 2. Total Active Federal Service                                     | 12. Mental Category at Entry                      |
| 3. Education Level                                                  | 13. Primary Military Occupational Specialty (MOS) |
| 4. Armed Forces Qualification Test (AFQT) Percentile Score at Entry | 14. Date of Separation/Accession                  |
| 5. Pay Grade                                                        | 15. Basic Active Service Date                     |
| 6. Date of Birth                                                    | 16. Expiration, Termination of Service (ETS) Date |
| 7. Race                                                             | 17. Service Component                             |
| 8. Educational Designator                                           | 18. Years of Active Duty Service                  |
| 9. Marital Status                                                   | 19. Character of Service (Enlisted)               |
| 10. Highest Year of Education Completed                             | 20. Character of Service (Officer)                |

Subsequent to receiving the above information, another request was sent to DMDC to obtain Armed Services Vocational Aptitude Battery (ASVAB) scores for all records.

#### National Highway Traffic Safety Administration (NHTSA)

The National Highway Traffic Safety Administration (NHTSA) maintains the National Driver Register (NDR), a central computer file of information on individuals whose license(s) to operate a motor vehicle has been revoked, suspended, cancelled, or denied. This data base contains information on the indicators of previous traffic violations, and possible previous accident history and DUI involvement. The NDR contains adequate personal data for matching, (such as name, date of birth, sex, height, weight, etc.,) as well as the date and nature of the violation which led to the license suspension or revocation. The NDR receives its input primarily from state law enforcement agencies. Its primary purpose is to assist these officials in locating information about problem drivers when the driver applies for an operator's license.

The NHTSA did not release their data because Public Law 97-364 only authorizes release of NDR data only under specific circumstances. The law allows data to be released to state or federal licensing officials in connection with driver license applications or through state driver licensing officials to companies seeking information on an individual employed or seeking employment as a driver of a motor vehicle or as a railroad locomotive operator. Data can also be released to the Federal Aviation Administration (FAA) for an individual who has received or applied for an Airman's Certificate or to the National Transportation Safety Board (NTSB) or the Office of Motor Carriers in conjunction with an accident investigation. Finally, information is releasable to an individual desiring to determine if the file contains data on him or her.

Without access to NDR data, several other alternatives with the potential to provide information on traffic violations and accident history were explored. Realizing that the NDR was furnished its information from individual states, Dr. Donald W. Segraves, Executive Director of the All Industry Research Advisory Council (AIRAC), Chicago, Illinois, was contacted to ascertain if it would be practical, or possible, to obtain such information from individual states. AIRAC has done extensive research for the automobile insurance industry concerning the reliability of data on individual driving records received from individual states. No centralized clearing house for this information exists, save the "gross violator" data base (NDR) maintained by the NHTSA. Some of the problems with the available data are:

1. **Availability.** Over 20 states have passed legislation removing this information from the public record and restricting access to it, even by insurance companies. The number of states restricting the data is growing daily.
2. **Reliability.** The states are not standardized in the methodology used to record traffic violations and accidents. AIRAC estimates that, on a national level, only 18 percent to 20 percent of violations and accidents are recorded in the state data bases.
3. **Expense.** Insurance companies are charged between \$3 and \$10 for each individual motor vehicle record requested.

Dr. Segraves could not estimate the cost the states would charge for sharing the entire data base, but speculated that it would be quite expensive, particularly in view of the "hit and miss" nature of the expected return.

Because of these reasons, no requests for data were made to individual states.

#### United States (U.S.) Courts

Records of traffic violations occurring on U.S. Government installations are maintained by the Central Violations Bureau (CVB) of the Administrative Office, U.S. Courts. This data base contains information on individuals for the indicators of previous traffic violations, previous accident history, and DUI involvement. A sample copy of the data maintained by the CVB revealed that their information was very limited in scope, providing only name, address, date and type of violation, amount of fine, vehicle make and license number, and how the fine was paid. Information needed for matching individuals in this record to other records was very limited. SSANs typically are not a part of the CVB's data record. The two fields maintained by the CVB that were of use to the study were violator's name and offense, if SSANs could be obtained with the records. Requests for these two fields from records that had SSANs were made; however, even after numerous written and telephonic followups, no data had been received by the end of the contract period.

### Federal Bureau of Investigation (FBI) and State/Local Law Enforcement Agencies

The U.S. Department of Justice, FBI, National Crime Information Center (NCIC) was contacted in order to obtain data relevant to the indicators of Non-traffic offenses and criminal offenses. Because the NCIC is the national clearing house for data on wanted or missing persons, stolen property, and other law enforcement data, it was considered the optimum source for the data to support the study. However, NCIC data are restricted to criminal justice and criminal justice employment purposes. Therefore, these data could not be obtained. State and local law enforcement agencies who control data were similarly restricted or the data were too localized in nature to be useful, and therefore, was not requested.

### U.S. Army Criminal Investigation Command (USACIDC)

The USACIDC maintains in their Crime Records Center (CRC) a data base of their investigations and other military police criminal investigations. The CRC data base is indexed by name and other personal identifiers such as SSAN and date of birth. The data base includes records of traffic accidents, alcohol-and/or drug-related involvement, and other criminal activity. This data base could support the indicators of previous accident history, non-traffic offenses and criminal offenses. However, the CRC data base contains information about all persons involved in an investigation, (perpetrators as well as victims and witnesses) with no method of discrimination. Because of this, the CRC data base was unusable and, therefore, not requested.

### U.S. Army Drug and Alcohol Operations Agency (USADAOA)

The USADAOA maintains a data base called the Drug and Alcohol Management Information System (DAMIS) that is capable of supporting the indicator of indiscipline DUI/alcohol/drug involvement. DAMIS is the Army's repository for all Alcohol and Drug Abuse Prevention and Control Program (ADAPCP) referrals. Data within DAMIS are available for research purposes if the agency performing the research complies with Public Health Service, 42 Code of Federal Regulations, chapter 1, subpart D, paragraph 2.16 and paragraph 2.52, pertaining to protection of individual identities.

DAMIS is provided input by ADAPCP counseling centers Army wide using the Client Oriented Drug and Alcohol Reporting System (CODARS). The source document which provides DAMIS with individual information is DA Form 4465, October 85, ADAPCP Client Intake/Screening Record. From this form, the fields SSAN, service component, pay grade, date of birth, education level, and MOS were selected as matching criteria. Because each record in DAMIS indicates DUI/alcohol/drug involvement, any personnel match would be positive. These data were requested and received from the USADAOA.

## AVIATION-RELATED DATA BASES

During the search, aviation-related data bases belonging to the FAA, the NTSB, and the Army Research Institute (ARI) were located. Although phase 1 identified no indicator that applied specifically to aviation-related behavior or aviation accidents, a 21st indicator, entitled "Previous Aviation Accidents/Violations," was added to the list of indicators because of the availability of data in the NTSB and FAA data bases pertaining to aviation accidents and violations. Additionally, the ARI data base provided information on an individual's aptitude to learn pilot skills.

### NTSB

The NTSB maintains a data base of civil aviation accident data which contains information pertaining to the indicator previous aviation accidents/violations. The source document for this data is NTSB Form 6120.4, entitled "Factual Report, Aviation Accident/Incident." Information on this form is generated by NTSB accident investigators and is subsequently used to input data into their data base. The fields selected from this form to provide matching data were name, pilot certificate number, date of birth, age, sex, and principal profession. Three other fields were selected to discriminate between accident or incident involvement. Coordination was conducted to ensure that data were received only on individuals who had at-fault involvement in the accidents/incidents. The data were received and integrated into the study data base.

### FAA

The FAA maintains three data bases on civil aviation accidents and violations. The Pilot Deviation System (PDS) is maintained in dBase III format in the FAA's Office of Safety Analysis, National Aviation Safety Data Center, Washington, D.C. The Enforcement Information System (EIS) and the Accident/Incident Data System (AIDS) are maintained by the FAA's Aviation Standard's Operational Systems Branch, Oklahoma City, Oklahoma. The PDS data base contains information on reported deviations which occurred in U.S.-controlled airspace. PDS information is gathered from FAA Form 8020.11 (Preliminary notice) and the FAA Form 8020.5 (Final report). The data covers July 1985 to present and contains approximately 2,500 to 3,000 records for each year. The following PDS fields were selected for matching purposes: pilot name, copilot name, Airman's Certificate number (both pilot and copilot), and date of birth, (both pilot and copilot). Four other fields were selected to discern the nature and the seriousness of the violation committed.

The EIS contains information on all FAA enforcement cases and receives its input from completed FAA Form 2150-2 (Violation Report Data -- Certificate Action, Reprimands, Referrals), FAA Form 2150-3 (Violation Report Data -- Civil Penalties, Criminal, Miscellaneous), FAA Form 2150-4 (Violation Report Data -- Hazardous Materials), and FAA Form 2150-5 (Enforcement Investigative Report). This data base contains data for the most recent 5-years plus the current year, with 15,000 to 17,000 records for each year. The

following EIS fields were selected for matching purposes: violator's name, date of birth, and airman's certificate number. Four other fields were selected to discern the nature and the seriousness of the violation committed.

The AIDS contains information on all general aviation accidents/incidents, air carrier incidents, and some air carrier accidents. AIDS information is gathered from NTSB Forms 6120.19, 6120.1, and 6120.4 (accident reports); NTSB accident data tapes; FAA Form 8020.5 (incident reports); and teletype preliminary data. This data base also contains data for the most recent 5-years, plus the current year, with 7,000 to 8,000 records for each year. The following AIDS fields were selected for matching purposes: Airman's Certificate number, age, and profession. Two other fields were selected to discern the nature of the accident, and additional coordination was effected to ensure that data were received only on individuals who had at-fault involvement in the accidents/incidents.

The FAA and NTSB data were obtained. However, as the information was integrated into the data base, a potential matching problem was encountered. The FAA utilizes Airman's Certificate numbers rather than SSANs as the primary means of individual identification. Airman Certificates issued since 1980 are the same as an individual's SSAN. Older certificates are typically a 5- to 7-digit number. Certificate numbers are entered as a 9-digit field, using lead zeros for those SSANs for individuals who were issued Airman Certificates prior to 1980. According to the Social Security Administration, SSANs beginning with two zeros were issued to individuals in the Northeast United States. Additional matching of name, date of birth, age, and profession was necessary for any matches of SSANs beginning with two zeros.

### ARI

A source of data that provided a measure of an individual's aptitude for learning pilot skills and supports the indicator IQ and aptitude is the Flight Aptitude Selection Test (FAST). This battery of tests is administered by the Army to potential flight training candidates. Score results from both the Alternate FAST (AFast) and the Revised FAST (RFAST) batteries were obtained from the ARI, Aviation Research and Development Activity, Fort Rucker, Alabama. FAST battery scores, indexed by SSAN for matching purposes, were integrated into the study Statistical Analysis System (SAS) data base.

### USASC

The Army Safety Management Information System (ASMIS), the Army's accident data base maintained by the USASC, is the final data base used in this research. ASMIS receives its input from the various accident report forms used by the Army to report ground and aviation accidents. Aviation and ground accident data were selected on Army personnel who were involved in at-fault, human error accidents.

## Summary of Data Obtained

Data were received from eight data bases owned or controlled by six different organizations. The data bases contained information on individuals relevant to 11 of the indicators of indiscipline. These indicators and the data source are shown in table 2. Accessible computerized data bases were not found to support the following indicators:

- |                                |                                    |
|--------------------------------|------------------------------------|
| 1. Driving Experience          | 6. Early Social/Parental Relations |
| 2. Type of Driver Training     | 7. Socioeconomic Status            |
| 3. Previous Traffic Violations | 8. History of Life Events          |
| 4. Non-traffic Offenses        | 9. Negative Peer Relations         |
| 5. Criminal Offenses           | 10. Uneven Work Record             |

| Table 2                           |                            |       |         |      |     |     |
|-----------------------------------|----------------------------|-------|---------|------|-----|-----|
| Data Base/Indicator Matrix        |                            |       |         |      |     |     |
| INDICATOR OF INDISCIPLINE         | DATA BASE OWNER/CONTROLLER |       |         |      |     |     |
|                                   | DMDC                       | USASC | USADAOA | NTSB | FAA | ARI |
| Previous Driving Accident History |                            | X     |         |      |     |     |
| Military Rank                     | X                          | X     |         |      |     |     |
| Years Military Service            | X                          |       |         |      |     |     |
| DUI/Alcohol/Drugs                 |                            |       | X       |      |     |     |
| IQ & Aptitude                     | X                          |       |         |      |     | X   |
| Education Level                   | X                          |       | X       |      |     |     |
| Age                               | X                          | X     | X       | X    | X   |     |
| Age at Enlistment                 | X                          |       |         |      |     |     |
| Job Type and Level                | X                          | X     |         |      |     |     |
| Marital Status                    | X                          |       |         |      |     |     |
| Prev. Avn. Acc/Violations         |                            |       |         | X    | X   |     |

## Data Base Analysis - Method

The objective was to analyze a number of variables (especially those related to indiscipline) to determine which variables might predict accident involvement. Research was focused on both aviation and ground accidents for both officer and enlisted personnel.

A SAS data set was constructed from the desired data bases, and statistical procedures considered the most appropriate were developed. Also, the variables desired for the analysis and the accident years which would be covered (1985 to 1990) were selected. The data fields selected for analysis for both the ground accident data set and the aviation accident data set are contained in appendix B.

The SAS data set was constructed with the assistance of the USASC. Additionally, USASC contacted the "owners" of the various data bases and obtained the particular data fields that were needed for the analysis. Unfortunately, significant problems were encountered with these data bases. However, certain SAS procedures were conducted, and decisions regarding the analyses and their conclusions were made.

Aviation Accidents. The original plan for the aviation accident analysis called for the integration of a number of data bases with the DMDC master data base. The desired data bases included: FAA/DEV, FAA/EIS, FAA/AID, NTSB, CODARS, AFAST, RFAST, and ASMIS. Once the SAS data set was built, a PROC FREQ (frequency procedure) was run to determine the size and shape of the data distribution. Initial frequency distributions indicated that many of the data fields were poorly managed (e.g., name fields that did not consistently maintain last name first and first name last across the years sampled). This made matching among the data bases (necessary to build the SAS data set) nearly impossible. Also, in the case of the NTSB and FAA data bases, the number of matches between these data bases and the at-fault accident personnel of the ASMIS data base was too low to allow appropriate analyses. Finally, DMDC does not maintain ASVAB subtest scores for officers and warrant officers in its data base, and, U.S. Army pilots fall exclusively within the officer and warrant officer grade structures. As a result of these problems building the aviation data set, the analysis of aviation accidents was abandoned.

Ground Accidents. As with the aviation data set, a PROC FREQ was initially run on the ground accident data set. Unfortunately, the officer and National Guard/Reserve tapes provided by DMDC contained no valid entries. Therefore, the analysis of ground accidents was restricted to active Army enlisted personnel.

For the years of interest (1985 to 1990), there were approximately 56,000 at-fault accident individuals in the ASMIS data base. Of these, there were approximately 32,000 cases where the individual was enlisted, active Army, and the data base contained a valid SSAN. Of these 32,000 cases in the ASMIS data base, only 11,000 matched personnel in the DMDC data base. It is unknown why 21,000 at-fault accident individuals cannot be matched to the DMDC data base.

Further analysis of these 11,000 at-fault accident individuals was conducted. In order to analyze the 11,000 cases, a comparison group of nonaccident personnel was drawn from the nonaccident personnel in the DMDC data base. This nonaccident sample was chosen by a procedure which utilized a digit of the SSAN as a random number.

### Data Base Analysis - Results

A correlation procedure (PROC CORR) was conducted to build a correlation matrix among the variables used in the ground accident analysis. Because of the large sample size (approximately 22,000), well over half of the variables (appendix B) correlated significantly with accident involvement. This is a statistical artifact found when large samples are used. There is a definite relationship between these variables and accident involvement. However, the individual variables explain so little of the outcome (of whether or not a person

will be involved in an accident), that, for all practical purposes, they are useless. No correlation was higher than 0.10.

However, one variable was an exception. The variable CODARS had a 0.11 correlation with accident involvement. CODARS is a data base which includes individuals who have been referred for drug or alcohol counseling. However, this high correlation is probably an artifact of the reporting process. If a person is involved in an accident which involves drugs or alcohol, he/she is automatically referred to the CODARS program. Also, the likelihood of a drug or alcohol problem being uncovered and the individual then being referred to CODARS is probably greater if the person has been involved in an accident. So, while involvement with drugs or alcohol might be good predictors of accident involvement, it was not supported by the data because it is not known how many military personnel have alcohol or drug problems, are not referred to CODARS, and do not have accidents. These data do not exist.

Finally, on the basis of earlier findings (reference 2), it was expected that strong relationships between certain ASVAB subtest scores and accident involvement would exist. Although many of the subtests did have a significant correlation with accident involvement, none of the correlations was high enough to be a practical predictor of accidents. It is not known why the data failed to replicate the results of earlier research. One reason could be that this accident data sample represented a different time period than that of the Beall study. Another reason for the discrepancy is that recently ASVAB data have been recorded as raw scores rather than percentiles. This inconsistency made accurate analysis of the ASVAB scores impossible.

Because of the low correlations between possible predictors and accident involvement and because data limitations did not permit multivariate analyses, the discriminant analysis (or some variation of it) originally planned for this study was not performed.

## MOTIVATIONAL MANAGEMENT SYSTEM

### Method

A systematic review of 484 Class A-C Army aviation accidents attributed to human error was conducted by subject matter experts to: identify human errors due wholly or partly to indiscipline; match these errors to a preliminary list of high-risk behaviors provided by the USASC; refine the description of the preliminary list of high-risk behaviors to more accurately describe the behavior as indicated in the accident report; and compile a final, prioritized list of the most frequently occurring high-risk behaviors for subsequent field testing. A data extraction form was developed and used to document specific information about each accident case (appendix C). This information included the human performance errors and their causes, the duty position of the person committing the errors, and the type of high-risk behavior if the error was caused by indiscipline. Also, the analysts decided if the high-risk behavior was flagrantly or non-flagrantly committed. That is, if it was blatant, disgraceful, shocking, or outrageously evident, the analysts coded the behavior as flagrant.

Each accident case was analyzed by at least two aviation accident investigation experts who resolved any differences before entering the data into a computerized data base. When assigning a behavior type, the experts utilized a hierarchy of high-risk behaviors developed from a preliminary list of high-risk aviation behavior provided by the USASC. These behaviors were then refined to more accurately describe the behavior on the basis of information in the accident reports. As undefined high-risk behaviors were found in the accident reports, additional behavior types were developed, refined, and added to the list. A complete list of all the high-risk behaviors is located in appendix D.

In many instances, findings listed in the accident reports did not accurately identify errors caused by indiscipline, requiring further review of each accident case. The additional review allowed the researchers to better define the cause(s) of the accidents and to more precisely describe the high-risk behaviors that individuals displayed. Each instance of high-risk behavior identified during the initial review was reviewed again to attribute errors to either "individual failure" or "system failure." For an error to be caused by individual failure, it is required that clear and practical standards exist for the task being performed, that the aviation crewmember be trained to those standards, and that the chain of command enforce those standards. Errors resulting from inadequate written procedures or standards, institutional or unit training, coordination, or supervision were attributed to system failures.

The high-risk behaviors were sorted by major category (table 3) and specific subcategory (appendix E). Each of these categories was evaluated in terms of frequency of occurrence, cost, number of fatalities, number of injuries, and number of flagrant violations. A percentage was calculated for each of these five parameters. An additional value was calculated on the basis of the percentage of the individual high-risk behavior that were flagrant violations. The high-risk behaviors were prioritized using an average percentage value of the six parameters.

| Table 3                                                                                      |                     |                          |               |                |                |                  |       |
|----------------------------------------------------------------------------------------------|---------------------|--------------------------|---------------|----------------|----------------|------------------|-------|
| HIGH RISK BEHAVIORS - MAJOR CATEGORY                                                         |                     |                          |               |                |                |                  |       |
| HRB CATEGORY                                                                                 | FREQUENCY<br>N = 97 | COST<br>N = \$90,311,096 | FAT<br>N = 37 | INJ<br>N = 138 | FLAG<br>N = 48 | % of<br>FlagViol | AVG % |
| 2.1 - Unauthorized Flight Maneuver/Violating Regulatory Guidance                             | 22<br>(22.7%)       | \$24,540,297<br>(27.2%)  | 23<br>(62.2%) | 33<br>(23.9%)  | 19<br>(39.6%)  | (86.4%)          | 43.7  |
| 2.3 - Intentionally Operating Acft Unnecessarily Close to Obstacles                          | 9<br>(9.3%)         | 2,806,480<br>(3.1%)      | 4<br>(10.8%)  | 9<br>(6.5%)    | 7<br>(14.6%)   | (77.8)           | 20.4  |
| 1.0 - Flying Acft Without Performing or Improperly Performing Required Flight Planning Tasks | 16<br>(16.5%)       | 27,219,299<br>(30.1%)    | 3<br>(8.1%)   | 20<br>(14.5%)  | 5<br>(10.4%)   | (31.3%)          | 18.5  |
| 4.0 - Allowing Unsafe Acts in Flight (Supervisory Error)                                     | 8<br>(8.3%)         | 3,569,706<br>(4.0%)      | 2<br>(5.4%)   | 3<br>(2.2%)    | 6<br>(12.5%)   | (75.0)           | 17.9  |
| 2.2 - Operating Acft Outside of Accepted Flight Envelope/Profile                             | 13<br>(13.4%)       | 5,797,423<br>(6.4%)      | 3<br>(8.1%)   | 24<br>(17.4%)  | 6<br>(12.5%)   | (46.2%)          | 17.3  |
| 2.6 - Failure to Follow Flight Procedures for Specific Flight Profile                        | 19<br>(19.6%)       | 16,608,941<br>(18.4%)    | 1<br>(2.7%)   | 40<br>(29.0%)  | 3<br>(6.3%)    | (15.8%)          | 15.3  |
| 2.5 - Failure to Follow Flight Procedures for Emergency or Near-emergency Situation          | 6<br>(6.2%)         | 7,413,311<br>(8.2%)      | 0<br>(0%)     | 7<br>(5.1%)    | 2<br>(4.2%)    | (33.3)           | 9.5   |
| 2.4 - Failure to Ensure Sufficient Clearance from Obstacles (Search Error)                   | 2<br>(2.1%)         | 1,285,657<br>(1.4%)      | 1<br>(2.7%)   | 0<br>(0%)      | 0<br>(0%)      | (0.0)            | 1.0   |
| 3.1 - Allowing CP or other CM's to Incorrectly Perform their Duties                          | 2<br>(2.1%)         | 1,069,982<br>(1.2%)      | 0<br>(0%)     | 2<br>(1.5%)    | 0<br>(0%)      | (0.0)            | 0.8   |

A complete prioritized listing of the 44 specific categories of high-risk behavior with their associated numerical codes is located in appendix E. The 20 specific categories were limited to those high-risk behaviors with multiple occurrences and comprise page 1 of appendix E.

A questionnaire (appendix F) was developed to survey Army aviators about their personal experiences with high risk behavior, using the top 10 high-risk behaviors pertaining to pilot, copilot, or crewmembers from the prioritized list of high-risk behaviors (appendix E). The responses would provide the researchers with a baseline of high-risk behavior in Army aviation units by indicating frequency of high-risk behavior apart from accident data. The questionnaire was designed to determine how many times the respondent had actually performed, personally observed, or been told about others committing high-risk behavior actions. The high-risk behaviors in the questionnaire were presented randomly so the respondents would not be influenced by their order. Additional information was also sought concerning the degree of disciplinary action the respondent thought was appropriate for a first-offense commitment of an high-risk behavior. A limited amount of demographic data was included in the questionnaire, primarily to aid in correlating individual experience levels with the responses received, but anonymity was maintained to encourage honest responses. The questionnaire was pretested using a group of aviators attending the Aviation Safety Officer (ASO) Course at Fort Rucker, Alabama. On the basis of these results, refinements were made to the questionnaire.

A review of ARs was conducted to determine the administrative actions presently available to commanders to preclude high-risk behavior. Several documents including the phase 1 final report, Inadequate Self-discipline as a Causal Factor in Human Error Accidents (Runcie, 1991), (reference 1) the Personal Accountability Survey (Runcie, 1991), (reference 3) an article in Professional Safety, Motivational Management Techniques for Safety and Health (Gregory, 1991), (reference 4) and the Aircrew Coordination Training Handbook (Geis & Alverado, 1989), (reference 5) were reviewed to obtain information about potential risk management techniques. Two candidate risk management techniques were developed for implementation in aviation units. A brief survey was conducted to assess the willingness of aviation unit commanders and Army aviators to implement or support the two techniques in their units (appendix G). The survey was administered to attendees to the Aviation Pre-Command Course (PCC) and the ASO Course at Fort Rucker, Alabama. The techniques were then refined on the basis of the results of the survey.

## **Results**

### **Accident Case Review**

Of the 484 accident cases analyzed, 80 cases were rejected for the reasons shown in table 4:

| <b>Table 4</b>                                    |            |
|---------------------------------------------------|------------|
| <b>Reasons for Rejected Accident Cases</b>        |            |
| <b>Total Accidents Reviewed</b>                   | <b>484</b> |
| <b>Accidents Rejected</b>                         | <b>80</b>  |
| Preliminary Report of Aircraft Mishap (PRAM) Only | 25         |
| No Human Error                                    | 40         |
| Insufficient Information                          | 10         |
| No Aviation Crew Error                            | 5          |
| <b>Total Accidents in Data Base for Analysis</b>  | <b>404</b> |

Of the 404 accident cases remaining for analysis, 89 cases contained a total of 97 separate instances of high-risk behavior caused by individual failure. From these instances, eight major categories and 40 subcategories of high-risk behavior types were identified (appendix D). There were an additional five subcategories and one major category for aviation supervisors. High-risk behavior was involved in over 20 percent of the analyzed accident cases, with approximately half of those occurrences involving flagrant violations of regulations or procedures. The most commonly occurring type of high-risk behavior involved unauthorized aerobatics, return-to-target maneuvers, or "buzzing" ground vehicles. Table 5 depicts general information about the sample including accident classifications, number of fatalities, number of injuries, overall costs, and the number and percentage of cases containing instances of high-risk behavior.

| Table 5                                   |               |              |         |
|-------------------------------------------|---------------|--------------|---------|
| General Information about the Data Sample |               |              |         |
|                                           | Total         | No. w/HRB    | % w/HRB |
| Accidents                                 | 404           | 89           | 22%     |
| Class A                                   | 142           | 48           | 34%     |
| Class B                                   | 42            | 7            | 17%     |
| Class C                                   | 220           | 34           | 15%     |
| Fatalities                                | 147           | 37           | 25%     |
| Injuries                                  | 387           | 138          | 36%     |
| Cost                                      | \$292,329,211 | \$90,311,096 | 31%     |

Table 6 depicts the number of high-risk behavior occurrences found in 89 cases and a comparison between the flagrant and non-flagrant errors.

| Table 6                                                 |              |              |              |
|---------------------------------------------------------|--------------|--------------|--------------|
| Comparison of Flagrant and Non-flagrant HRB Occurrences |              |              |              |
|                                                         | Total*       | Flagrant     | Non-Flagrant |
| Errors                                                  | 97           | 48           | 49           |
| Class A                                                 | 54           | 28           | 26           |
| Class B                                                 | 7            | 3            | 4            |
| Class C                                                 | 36           | 17           | 19           |
| Fatalities                                              | 37           | 32           | 5            |
| Injuries                                                | 138          | 71           | 67           |
| Cost                                                    | \$90,311,096 | \$39,860,704 | \$50,450,392 |

\* 89 Aviation Accidents

During the initial accident case reviews, the analysts determined that the broad definition of high-risk behavior (human errors due wholly or partly to indiscipline) could not be used without a detailed review of the accident report. Review of only the findings and recommendations was not adequate for the purpose of this study. It was clear from the evidence in the accident reports that the systemic sources of error reported for some accidents, even though categorized as indiscipline, described system failures rather than individual failures and did not truly represent high-risk behavior. For instance, many occurrences of high-risk behavior category 2.4, Failing to ensure sufficient clearance from obstacles, reflected training or procedural problems rather than individual failures, even though individual failure was cited as the cause. The analysts reexamined the accident cases to separate errors caused by individual failure from those caused by inadequate written procedures, institutional or unit training, supervision or coordination (system failures). This resulted in substantially fewer accidents with high-risk behavior within this data sample than found in previous analyses based only on reported causes with no detailed case review.

The following definition of aviation high-risk behavior was developed for use during all subsequent case analyses:

"Personnel who operate aviation equipment or who manage or supervise personnel and equipment, exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline), placing aviation personnel or equipment at a level or risk exceeding that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation, as well as overconfidence, lack of confidence, self-imposed fatigue, or alcohol/drug abuse. In the absence of other systemic sources associated with inadequate written procedures, institutional/unit training, or supervision, the high-risk behavior is attributed to individual failure. High-risk behavior can be either flagrant or non-flagrant."

### AR 600-105 Review

A review of AR 600-105 (reference 6) was conducted to determine the adequacy of the Army system in dealing with high-risk behavior. Although high-risk behavior is not specifically addressed, the regulation does give a commander the authority to impose an immediate, non-medical, temporary suspension from flying duty for up to 30 days for, among other reasons, flagrant violation of flying regulations. The regulation further recommends the convening of a Flying Evaluation Board (FEB) in the case of a flagrant violation. FEBs can recommend administrative actions as severe as permanent disqualification of an aviator from aviation service. The regulation also states that disciplinary action under the provisions of the Uniform Code of Military Justice may be initiated against aviators as punishment for the violation of flying or other regulations.

Other tools not mentioned in AR 600-105, but frequently used by aviation commanders include informal and formal verbal counseling and letters of reprimand which may or may not be forwarded to the custodian of the aviator's official military personnel file.

### Aviator Survey Pretest Data

The questionnaire (appendix F) used to determine the high-risk behavior baseline for unit aviators was pretested on 39 Army aviators attending the ASO Course at Fort Rucker, Alabama. Complete results of the pretest are located in appendix H. This group of aviators was somewhat atypical due to their age (which averaged 38.7 years), length of aviation service (which averaged 13.5 years), and overall flight experience (which averaged 2,789 hours). Well over one third of the aviators had combat experience which, before Operation Desert Storm, would have been unusual in the average Army aviation unit. This experience and flight time aberration were likely due to the high percentage of National Guard/Reserve aviators in the class. With that in mind, results of the survey revealed a pattern in the aviators' responses regarding the increasing frequency of high-risk behavior as the questions progressed from those personally committed to those only heard about. Furthermore, the same five types of high-risk behavior, albeit in differing order, had the highest frequency of occurrence for all three types of responses. (See table 7.)

| Table 7                                                                         |                                                                                 |                            |          |             |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------|----------|-------------|
| Order of Occurrence Comparison Between Accident Data and Aviator Survey Pretest |                                                                                 |                            |          |             |
| Accident Data/Order of Occurrence                                               |                                                                                 | Survey Order of Occurrence |          |             |
|                                                                                 |                                                                                 | Performed                  | Observed | Heard About |
| 1.                                                                              | Performing unauthorized aerobatics                                              | 4                          | 5        | 5           |
| 2.                                                                              | Flying in illegal or unacceptable weather                                       | 5                          | 4        | 3           |
| 3.                                                                              | Operating too close to obstacles                                                | 9                          | 9        | 10          |
| 4.                                                                              | Failing to perform or improperly performing required performance planning tasks | 1                          | 2        | 2           |
| 5.                                                                              | Incorrectly following emergency procedures for engine malfunctions              | 10                         | 8        | 9           |
| 6.                                                                              | Exceeding airspeed, power, or RPM limits                                        | 6                          | 7        | 8           |
| 7.                                                                              | Not documenting hazard maps                                                     | 2                          | 1        | 4           |
| 8.                                                                              | Not completing preflight checks                                                 | 8                          | 6        | 6           |
| 9.                                                                              | Exceeding crew endurance limits                                                 | 3                          | 3        | 1           |
| 10.                                                                             | Exceeding fuel endurance limits                                                 | 7                          | 10       | 7           |

Results of the pretest indicated that the most frequently occurring high-risk behaviors were associated with improper performance planning, exceeding crew endurance, or improperly documenting hazard maps. Improper performance planning was the only one of these in the top five most frequently occurring high-risk behaviors according to the accident data. Correlations were generated, using the Pearson Product Moment Correlation, between each paired combination of the three scales (e.g., performed, observed, and heard about) to determine if any of the scales duplicated information contained in one of the other scales. The correlations between the three scales were statistically significant at the 0.01 level, but not large enough to justify eliminating any one of the three scales. Table 8 shows results of these correlations. On the basis of results of the pretest and the suggestions provided by the respondents, the questionnaire was revised and two more scales were added. The refined questionnaire is shown in appendix I. Deployment of U.S. Army Forces to Operation Desert Shield/Storm left insufficient time and resources to properly conduct the survey using the refined questionnaire.

Table 8

Aviator Survey Internal Correlations

Correlation Coefficient X: Performed Y: Observed

|        |             |              |            |
|--------|-------------|--------------|------------|
| Count: | Covariance: | Correlation: | R-squared: |
| 390    | 1.316       | 0.685        | 0.469      |

99% confidence level = 0.610 -0.748

Correlation Coefficient X: Performed Y: Heard About

|        |             |              |            |
|--------|-------------|--------------|------------|
| Count: | Covariance: | Correlation: | R-squared: |
| 390    | 0.641       | 0.334        | 0.112      |

99% confidence level = 0.215 -0.445

Correlation Coefficient X: Observed Y: Heard About

|        |             |              |            |
|--------|-------------|--------------|------------|
| Count: | Covariance: | Correlation: | R-squared: |
| 390    | 1.179       | 0.598        | 0.357      |

99% confidence level = 0.505 -0.675

## Risk Management Techniques

In developing risk management techniques which target the high-risk behaviors in table 3 and which would have minimal impact on unit administration and normal operating procedures, several potential techniques were considered and rejected. The point system proposed in the phase 1 final report (reference 1) contains several flaws. First, it requires a formal reporting and recording system not presently available to the aviation unit commander. The proposal fails to mention who will report, investigate, and verify the reported violations. It also assumes a non-existent automated tracking system (DA Form 759) for recording the results. Second, the system usurps the commander's authority for enforcing the organizational safety climate by establishing a committee to discipline unsafe behavior. According to the proposal, the commander can reduce by 1 point the points assigned only if he puts it in writing. This is considered an unrealistic requirement. Finally, the criteria for initiating administrative actions are counterproductive. Allowing 10 points in 1 year or 15 points in 2 years before taking action tells pilots that, in essence, it is acceptable to flagrantly violate rules and regulations as long as you do not do it too often.

A proposal to encourage commanders to utilize existing administrative actions to preclude unsafe behavior was also considered but rejected on the basis of results of a study (reference 3) which assessed accountability for at-fault accidents during fiscal years 86 and 87 and compared these results with those of fiscal years 82 and 83. The researchers found that aviators who exhibited high-risk behavior which led to accidents during the most recent time period received favorable personnel actions at a rate almost three times that of unfavorable actions following the accident. During the earlier time period, this ratio was also 3 to 1, indicating little or no improvement in holding at-fault aviators accountable for unsafe actions. This is especially significant since the Army Vice Chief of Staff personally initiated a major campaign to improve accountability following the first study in 1984.

Another proposal to establish an awards program for not committing high-risk behavior (similar to the awards program for accident-free flying) was considered but rejected primarily because of the negative connotation associated with presenting an award to someone for not flagrantly violating procedures. Also, like the point system previously discussed, it would require a formal reporting and recording system which would have a significant impact on unit administration.

A review of the course outline and teaching materials for the Aircrew Coordination Training (ACT) program provided by Geis-Alverado & Associates (reference 5) revealed that it emphasizes "soft" concepts such as management theory, group dynamics, and interpersonal relations. Like other ACT programs currently available in the military and civilian aviation community, these concepts are not compatible with the Aviation Branch's emphasis on Aircrew Training Manual (ATM) tasks, conditions, and standards format which characterizes Army aviation training and operations.

Two high-risk management techniques were deemed appropriate for implementation in aviation units and are described in the following paragraphs. One of these techniques emphasizes education and the other emphasizes reinforcement/enforcement. Both techniques require aviation unit commanders to survey unit aviators to identify their perception

of the safety climate within the command. Because management of high-risk behavior is a cooperative effort between unit leaders and aviators, it is important to understand the unit aviator's perception of the organization's safety climate. This perception strongly influences his/her behavior on the job and the desire to learn from, and respond to, these programs. The overall safety climate of a unit can have a significant effect, both positive and negative, on individual aviator behavior. The Safety Climate Assessment Form contained within appendix G was developed to analyze the organization's safety climate. It should be administered to all unit aviators who have been assigned for at least 6 months. The completed forms should be anonymously submitted to a unit point of contact, possibly the ASO, who would keep the responses confidential and provide the commander with a summary. The results, which should be shared with all participants, will show how unit aviators view the safety climate and where corrective actions should be concentrated. Followup surveys may be appropriate to determine if progress has been made and in which areas further work is required.

### Education Program

The first technique involves educating leaders and unit aviators about high-risk behavior. In order to use the administrative actions available, commanders must know precisely what constitutes high-risk behavior, each type of high-risk behavior's relative level of severity (on the basis of cost, number of fatalities/injuries, and flagrant violations), and the appropriate corrective action to preclude further occurrence. Because management of high-risk behavior is both an individual (aviator) and leadership (commander) responsibility, unit aviators should also be included in this program. The High Risk Behavior/Corrective Action matrix contained within appendix G portrays the various high-risk behaviors that have resulted in accidents, their rank among high-risk behavior types, and suggested corrective actions. This matrix and the Prioritized List of Specific High-Risk Behavior Types in appendix E should be used by commanders and ASOs to develop a class to be given during unit-level safety meetings. Additionally, this information should be distributed to all attendees of the Aviation PCC. The matrix and a brief explanation of the information should also be published in FlightFax, Aviation Digest, and other aviation-related publications. Providing aviators and commanders with descriptions of high-risk behavior, the severity of accidents involving/caused by these behaviors, and appropriate corrective actions may motivate aviators to perform to standards and commanders to act when high-risk behavior occurs.

### Reinforcement/Enforcement Program

The second technique requires commanders to establish positive reinforcement techniques to encourage proper behavior. In modifying behavior, psychologists suggest that tighter control over people is not the only answer. Positive reinforcement rather than punishment and discipline is recommended as much more effective in changing human behavior. Positive reinforcement is the act of rewarding a person for his/her actions in order to encourage the recurrence of the behavior. One of the most effective rewards is recognition and personal praise from the commander. For example, if a pilot in command, air mission commander, or flight leader properly determines the weather or other environmental conditions to be less than that required for successful mission accomplishment and

delays or cancels the mission, the commander should publicly commend the aviator for the decision. Likewise, when a unit aviator chooses not to fly because he is fatigued or ill and this condition is confirmed by the flight surgeon, the commander should openly praise the aviator's judgment. Even when an aviator makes a mistake; i.e., improper fuel planning, but decides to land short of destination and call for assistance, the commander should emphasize the correct decision to land short versus the planning error because continuing the mission might have resulted in a catastrophic accident.

Of course, when the commander learns of an aviator who has displayed high-risk behavior, he should take swift and appropriate corrective action and ensure all other unit aviators are aware of the infraction and the consequences. The ultimate goal of this reinforcement/enforcement program is to encourage each unit aviator to perform properly and make-on-the spot corrections so that everyone understands that proper behavior is recognized and high-risk behavior is not condoned within the unit.

### Risk Management Techniques Survey Results

The survey was administered to 13 field grade aviation officers (lieutenant colonels and colonels) attending the Aviation PCC and 34 warrant and commissioned officer aviators attending the ASO Course. The PCC attendees are programmed to command aviation brigades and battalions, and the ASO attendees are aviators who will return to their units as qualified safety officers. The survey was administered to the ASO attendees during normal class time, whereas the PCC attendees were asked to complete the survey after normal class time and were provided a pre-addressed envelope in which to return the survey. All 34 ASO Course surveys were completed and returned; however, only three of the 13 PCC surveys were returned.

The results of the ASO survey indicated overwhelming support for the education program but less than enthusiastic support for the reinforcement/enforcement program. Every respondent (100 percent) answered all three questions positively for the education program. They believed this program could be implemented with minimal impact on unit administration and indicated they would support it in their units. However, almost 63 percent of the respondents indicated that the reinforcement program could not be implemented with minimal impact on unit administration and operating procedures. When asked whether they would support the program in their unit and whether they believed other ASOs would support it in their units, 38 percent and 30 percent, respectively, answered negatively. There were several common suggestions and comments provided by the ASO respondents including:

- many commanders are high-risk aviators (mission-oriented, Officer Efficiency Report driven)
- enforcement program requires strong support from chain of command,
- enforcement program ties the commander's hands,
- delete corrective action matrix, leave to commander's discretion,
- some corrective actions for nonflagrant violations too severe, and
- institute education program in Initial Entry Rotary Wing (IERW), Instructor Pilot (IP) Course, Advance Course, PCC, etc.

The results of the PCC survey were inconclusive based on the few attendees who returned their surveys. Two of the three respondents answered all three questions negatively, indicating that adequate policies were already in place in which to deal with this problem. They especially did not want the USASC to establish "fixed rules" for corrective actions to deal with high-risk behavior which would limit the actions available to commanders.

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## **CONCLUSIONS AND RECOMMENDATIONS**

### **PREDICTING INDISCIPLINE**

#### **CONCLUSIONS:**

Computerized data bases were able to provide information pertaining to only 11 of the 21 identified indicators of indiscipline. ASMIS provided information pertaining to only four of the indicators. Additional measures are necessary to collect adequate information to support the compilation of a computer file on Army personnel which would assist in predicting indiscipline.

Because of missing fields and inconsistencies in data that were obtained, statistical analysis was not successful in predicting indiscipline or demonstrating a significant relationship between the 11 indicators of discipline and a person's likelihood to have an accident.

Although the results of this research effort were not as fruitful as hoped, there were some important lessons and findings. First, many of the data bases that might have provided the more logical variables related to accidents (e.g., U.S. Courts, NDR) were impossible to access, primarily due to legal restrictions. Second, many of the data bases that were accessed appeared to be inconsistently maintained, resulting in a majority of observations being discarded. Third, of the variables that were included in the study, none yielded a strong practical relationship to accident involvement. These findings differ from those of Beall (1972), (reference 2) who reported strong significant relationships between accidents and two of the ASVAB subtests (Coding Speed and Arithmetic Reasoning).

#### **RECOMMENDATION:**

USASC attempt to collect data on Army individuals pertaining to the indicators of indiscipline during the accident investigation process. This could be done by modifying existing investigation instructions to include specific inquiries and appropriate background investigations of individuals involved in Army accidents. Information should be collected on personnel at fault and not at fault, including witnesses, passengers, and others selected by the accident board. This would provide USASC, over time, information on accident and non-accident groups pertaining to the indicators of indiscipline. These data could then be used analytically to predict indiscipline and subsequently serve as the basis for the modification of recruitment and assignment procedures.

### **MOTIVATIONAL MANAGEMENT SYSTEM**

#### **CONCLUSIONS:**

Accidents resulting from high-risk behavior are a significant problem in Army aviation. Previous attempts to reduce this problem through increased emphasis on personal accountability and the use of negative enforcement programs have been largely unsuccessful. Information pertaining to the specific types of high-risk behavior, the severity of accidents

resulting from them, and methods to alleviate the problem have not been readily available to the aviation community.

Army accident investigations have incorrectly attributed errors to causes associated with indiscipline when, in fact, many of these errors resulted as much from system as individual failures. That is, the evidence in the accident reports indicates that many of the errors were caused by other systemic sources such as inadequate written procedures or training.

The present taxonomy for identifying errors and their causes requires modification. Many accident reports within the sample listed an error of improper inattention with a corresponding cause of inadequate attention. In those cases, the reports did not reveal why the crewmember's attention was improper or inadequate. That is, they failed to specify whether the crewmember's attention was inside the cockpit at the wrong time, diverted by another task, or whether he was simply overtasked and unable to cope with the situation. The level of crew coordination among the crewmembers was not normally addressed. Crew coordination training or training designed to teach crewmembers techniques to divide their attention, scan, monitor, survey, or time share more effectively in terrain flight or night environments may be valid techniques to improve attention.

The proposed risk management technique to educate the aviation community about high risk behavior was generally well received even though there were some negative comments about the suggested corrective actions matrix. Several respondents felt that the suggestions would become "fixed rules" and would limit the actions available to commanders. Others indicated that it would require uncharacteristically strong support from the entire chain of command to execute. The reinforcement/enforcement technique was less than enthusiastically received, primarily because of its use of the high-risk behavior corrective action matrix. Several of the aviator respondents did not believe the positive enforcement examples were realistic, on the basis of their past experience with support from their chain of command. However, on the basis of the Army's previous unsuccessful attempt to reduce high-risk behavior which basically allowed maximum latitude to commanders in punishing offenders, and was based on negative enforcement actions, it appears that some changes are needed. These changes should include consistent guidance for corrective action and a philosophical shift in the manner in which the program is enforced.

Survey pretest results indicate that the types of high-risk behavior exhibited in Army accident reports are not necessarily the types of high-risk behavior most frequently committed by aviators in the field. However, the pretest aviator sample was atypical from a normal Army aviator cross section in terms of age, length of service, total flight time, and combat flight time. Consequently, the sample may not have provided an accurate high-risk behavior baseline in aviation units.

## RECOMMENDATIONS:

During the investigation of Army accidents, care should be taken to properly discriminate between errors caused by individual and those caused by system failures. Additionally, coding procedures should be developed to enter these errors into ASMIS so high-

risk behavior (flagrant and non-flagrant) may be retrieved independently of associated errors and causes.

The USASC should revise the current 3W taxonomy used by accident investigators to eliminate inadequate attention as a system cause for human error in order to force investigators to identify the systemic cause of inattention.

The Army should institute the proposed education and reinforcement/enforcement techniques contained in this study for combating high-risk behavior committed by aircrew-members. The education program should be implemented at unit and institutional level. Commanders and ASOs should develop classes on high-risk behavior for presentation during unit safety meetings. Aviation unit commanders should receive information on high-risk behavior while attending the Aviation PCC. The corrective action matrix and a brief explanation of the information concerning high risk behavior should be published in FlightFax, Aviation Digest, or other aviation-related publications.

Aviation unit commanders should establish positive reinforcement techniques to encourage proper behavior. Use of suggested corrective actions when disciplining aviators who have exhibited high-risk behavior is recommended.

If further data are needed to establish a base line of high-risk behavior in Army aviation units, the USASC should administer the refined survey developed by this study to a larger sample of Army aviation personnel. The survey should be administered either by direct mail or on site by a disinterested third party in order to assure survey participants that their responses would be kept confidential.

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## **APPENDIX A**

### **RECRUITMENT FILE FACTORS RELATED TO ACCIDENTS**

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**Recruitment File Factors Related to Accidents\***

| Reference               | Previous Traffic Violations | Previous Accident History | Driving Experience ** | Type of Driver Training ** | Military Rank | Years of Military Service | DUI, Alcohol and Drugs | Non-Traffic Disciplinary | Criminal Offenses | Early Socialization and Parental Relations ** | IQ and Aptitude | Socioeconomic Status ** | Education Level | Age | Age at Enlistment | Job Type and Level | Marital Status | History of Life Events and Changes | Negative Peer Relations ** | Uneven Work Record |
|-------------------------|-----------------------------|---------------------------|-----------------------|----------------------------|---------------|---------------------------|------------------------|--------------------------|-------------------|-----------------------------------------------|-----------------|-------------------------|-----------------|-----|-------------------|--------------------|----------------|------------------------------------|----------------------------|--------------------|
| Beall (1972)            | X                           |                           |                       |                            | X             | X                         | X                      | X                        | X                 |                                               | A               |                         |                 | X   |                   |                    |                |                                    |                            |                    |
| Beshai (1984)           |                             |                           |                       |                            |               | X                         | X                      |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Clayton (1985)          |                             |                           | X                     |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 | X   | X                 |                    |                |                                    |                            |                    |
| Ferguson et al. (1984)  |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               | B               |                         | X               | X   |                   |                    |                |                                    |                            |                    |
| Linn & Bragg (1986)     |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 | X   |                   |                    |                |                                    |                            |                    |
| Hanson (1988)           |                             |                           |                       |                            |               |                           | X                      | C                        | X                 |                                               |                 |                         |                 |     |                   |                    |                | D                                  |                            |                    |
| Harano (1975)           | E                           |                           |                       |                            |               |                           |                        |                          | X                 |                                               |                 |                         |                 | X   |                   |                    |                |                                    |                            |                    |
| Jonah (1986)            |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 | X   |                   |                    |                |                                    |                            |                    |
| Kadell & Peck (1984)    | E                           |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Koz (1984)              |                             | X                         |                       |                            |               |                           |                        |                          |                   | X                                             | F,G             | X                       |                 |     |                   |                    |                |                                    |                            |                    |
| Majors (1984)           |                             |                           |                       |                            |               |                           |                        | II                       |                   |                                               |                 |                         |                 |     |                   |                    |                | X                                  | X                          |                    |
| McGuire (1976)          |                             |                           |                       |                            |               |                           |                        | C                        |                   | I,J                                           |                 |                         |                 | X   |                   |                    |                |                                    |                            | X                  |
| McKenna (1983)          |                             | X                         |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Peck (1985)             | K                           |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 | X   |                   |                    |                |                                    |                            |                    |
| Pestonjee et al. (1980) | X                           |                           | X                     |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 | X   |                   | X                  |                |                                    |                            |                    |
| Plant et al. (1984)     |                             |                           |                       |                            |               |                           | X                      |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Risser (1985)           |                             | I.                        |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Sanders (1964)          |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 |     |                   | X                  |                |                                    |                            |                    |
| Sipes (1986)            |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               |                 |                         |                 |     |                   |                    |                |                                    | X                          | X                  |
| Voicu & Nereula (1985)  |                             |                           |                       |                            |               |                           |                        |                          |                   |                                               | M               |                         |                 |     |                   |                    |                |                                    |                            |                    |
| Wilde (1976)            |                             |                           |                       |                            |               |                           |                        |                          |                   | N                                             |                 |                         | X               |     |                   |                    |                |                                    |                            |                    |
| Williams et al. (1974)  |                             |                           |                       | X                          |               |                           |                        |                          |                   |                                               |                 | X                       |                 | X   |                   | X                  |                |                                    |                            |                    |

\* Factors denoted by the letter X are generic in that they are no more specific than the factor names themselves. However, factors denoted by the letters A through N refer to elements which are more specific than the factor names.

\*\* The factors could be obtained from enlistment interview or obtained from "request for waiver disqualification" form. The other factors come directly from the recruitment file. This information was obtained from an Army Recruitment Office.

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## **APPENDIX B**

### **DATA FIELDS SELECTED FOR ANALYSIS**

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## DATA FIELDS SELECTED FOR ANALYSIS

### Ground Accident Data Set

#### Identifiers

Accident Entry Number  
Name  
SSAN  
Date of Accident  
Date of Birth  
Basic Active Service Date

#### Categorical Variables

Ground Accident (yes/no)  
Accident Year  
Grade  
Sex  
MOS (Current at Accident)  
Day of Accident (Mon-Sun)  
Time of Accident (0030-2400)  
Month of Year  
Type of Accident  
Type of Activity  
Type of Equipment  
Period of the Day  
Race  
Marital Status  
Classification of Accident  
Physical Location of Accident  
State of Accident  
Character of Service

#### Continuous Variables

Grade  
Age (at Time of Accident)  
Years of Service  
AFQT%  
Ed. Level  
Ed. Distinguisher  
ASVAB-GS  
ASVAB-AR  
ASVAB-WK  
ASVAB-PC  
ASVAB-NO  
ASVAB-CS  
ASVAB-A/S  
ASVAB-MK  
ASVAB-MC  
ASVAB-EL

### Aviation Accident Data Set

#### Identifiers

Accident Entry Number  
Name  
SSAN  
Date of Accident  
Date of Birth  
Basic Active Service Date

#### Categorical Variables

Aviation Accident (yes/no)  
Accident Year  
Grade  
Sex  
MOS (Current at Accident)  
Day of Accident (Mon-Sun)  
Time of Accident (0030-2400)  
Month of Year  
Type of Aircraft  
Period of the Day  
Race  
Marital Status  
Classification of Accident  
Physical Location of Accident  
State of Accident  
Character of Service  
FAA/DEV  
FAA/EIS  
FAA/AID  
NTSB

#### Continuous Variables

Grade  
Age (at Time of Accident)  
Years of Service  
AFQT%  
Ed. Level  
Ed. Distinguisher  
ASVAB-GS  
ASVAB-AR  
ASVAB-WK  
ASVAB-PC  
ASVAB-NO  
ASVAB-CS  
ASVAB-A/S  
ASVAB-MK  
ASVAB-MC  
ASVAB-EL

Selfscr (Afast)  
Bginfo (Afast)  
Incomscr (Afast)  
Plxmvesc (Afast)  
Helscr (Afast)  
Cycscr (Afast)  
Mechscr (Afast)  
Equscr (Afast)  
Selfdes (Rfast)  
Biodes (Rfast)  
Incomp (Rfast)  
Plxmve (Rfast)  
Helknow (Rfast)  
Cyclor (Rfast)  
Mechfun (Rfast)  
Compgrde (Rfast)

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## **APPENDIX C**

### **DATA EXTRACTION FORM**

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# MOST FREQUENTLY VIOLATED AVIATION PROCEDURES/INDICATORS OF INDISCIPLINE -- CASE REVIEW SHEET

Case # \_\_\_\_\_

Identify the procedure governing correct performance that was not complied with and the duty position of the individual committing the error. Relate the appropriate task error and system inadequacy(s) to that reference. Indicate the phase of flight when the error occurred. Where appropriate, indicate the type of high risk behavior, whether the error was a flagrant violation or not, the activity, job, or task being performed when the error occurred, and additional reference.

Reviewer \_\_\_\_\_

Reference \_\_\_\_\_

Duty Position \_\_\_\_\_

TE \_\_\_\_\_

SI \_\_\_\_\_

Behavior Type \_\_\_\_\_

F/N \_\_\_\_\_

Chapter \_\_\_\_\_

ATM Task # \_\_\_\_\_

Para \_\_\_\_\_

Note # \_\_\_\_\_

TD # \_\_\_\_\_

P/F \_\_\_\_\_

Page \_\_\_\_\_

Standard # \_\_\_\_\_

TC \_\_\_\_\_

Task/Job/Activity Being Performed \_\_\_\_\_

Additional Reference \_\_\_\_\_

Reference \_\_\_\_\_

Duty Position \_\_\_\_\_

TE \_\_\_\_\_

SI \_\_\_\_\_

Behavior Type \_\_\_\_\_

F/N \_\_\_\_\_

Chapter \_\_\_\_\_

ATM Task # \_\_\_\_\_

Para \_\_\_\_\_

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Standard # \_\_\_\_\_

TC \_\_\_\_\_

Task/Job/Activity Being Performed \_\_\_\_\_

Additional Reference \_\_\_\_\_

Reference \_\_\_\_\_

Duty Position \_\_\_\_\_

TE \_\_\_\_\_

SI \_\_\_\_\_

Behavior Type \_\_\_\_\_

F/N \_\_\_\_\_

Chapter \_\_\_\_\_

ATM Task # \_\_\_\_\_

Para \_\_\_\_\_

Note # \_\_\_\_\_

TD # \_\_\_\_\_

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Page \_\_\_\_\_

Standard # \_\_\_\_\_

TC \_\_\_\_\_

Task/Job/Activity Being Performed \_\_\_\_\_

Additional Reference \_\_\_\_\_

Reference \_\_\_\_\_

Duty Position \_\_\_\_\_

TE \_\_\_\_\_

SI \_\_\_\_\_

Behavior Type \_\_\_\_\_

F/N \_\_\_\_\_

Chapter \_\_\_\_\_

ATM Task # \_\_\_\_\_

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Page \_\_\_\_\_

Standard # \_\_\_\_\_

TC \_\_\_\_\_

Task/Job/Activity Being Performed \_\_\_\_\_

Additional Reference \_\_\_\_\_

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## **APPENDIX D**

### **LIST OF HIGH-RISK BEHAVIOR TYPES**

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## **AVIATION HIGH RISK BEHAVIOR (HRB)**

Personnel who operate aviation equipment or who manage or supervise aviation personnel and equipment exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline) that place aviation personnel or equipment at a level of risk that exceeds that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation as well as overconfidence, lack of confidence, and self imposed fatigue and alcohol or drug abuse. High-risk behavior can be either flagrant or non-flagrant.

(Note: Some categories have been intentionally omitted.)

### **AVIATION HIGH RISK BEHAVIORS (Pilots/Copilots/CrewMembers)**

#### **1. FLYING AIRCRAFT WITHOUT PERFORMING OR IMPROPERLY PERFORMING, REQUIRED FLIGHT PLANNING TASKS**

- 1.1 Mission/crew briefing (designating crew duties/responsibilities)
- 1.2 Weather/NOTAM checks
- 1.3 Performance planning (power, fuel, weight/balance)
- 1.4 Documenting hazard maps (wires, obstructions)
- 1.5 Completing flight plans (route planning)
- 1.6 Completing aircraft preflight/equipment checks
- 1.7 Completing before takeoff/landing checks
- 1.8 Performing proper route/landing zone reconnaissance

#### **2. PERFORMING UNSAFE ACTS IN FLIGHT**

- 2.1 Unauthorized flight maneuvers/violating regulatory guidance
  - 2.1.1 Aerobatics/"buzzing" ground vehicles/return-to-target maneuvers
  - 2.1.3 Flying aircraft into unacceptable/illegal weather conditons
  - 2.1.4. Allowing nonrated personnel to fly aircraft
  - 2.1.5 Flying while fatigued or in violation of unit crew endurance policy
  - 2.1.6 Violating local traffic separation criteria
- 2.2 Operating aircraft outside of accepted flight envelope/profile
  - 2.2.2 Exceeding airspeed, power, or RPM limitations
  - 2.2.3 Exceeding fuel endurance limitations
  - 2.2.4 Exceeding other aircraft systems' limitations
  - 2.2.5 Operating in conditions conducive to Loss of Tail Rotor Effectiveness (LTE)
- 2.3 Intentionally operating aircraft unnecessarily close to objects
  - 2.3.1 Another aircraft
  - 2.3.2 Buildings/structures
  - 2.3.3 Vegetation/terrain
  - 2.3.4 External load

- 2.5 Failing to correctly follow procedures for emergency or near emergency situations**
- 2.5.1 Engine, fuel control, governor malfunctions**
- 2.5.3 Flight control malfunctions**
- 2.5.4 Other aircraft malfunctions**
- 2.5.6 Loss of visual contact with the ground and/or obstacle**
- 2.5.9 Landing gear malfunction**

- 2.6 Failing to correctly follow flight procedures for specific flight profiles**
- 2.6.1 Landing/hovering in snowdust**
- 2.6.2 Slope operations**
- 2.6.4 Night Vision Goggle approach**
- 2.6.6 Confined area takeoff**
- 2.6.7 Power approach/precision landing**
- 2.6.8 In-flight join-up**
- 2.6.12 Takeoff in snow/dust**
- 2.6.14 Negotiate wire obstacles**
- 2.6.16 High overhead approach**
- 2.6.18 Steep turn**

- 2.4 Failing to ensure sufficient clearance from obstacles**
- 2.4.1 Crewmember was not searching/scanning**
- 2.4.5 Crewmember searched, saw obstacle, but misjudged distance/closure rate/etc**

### **3. ALLOWING UNSAFE ACTS IN FLIGHT**

- 3.1 Allowing copilot or other crewmembers to incorrectly perform duties**
- 3.1.4 Obstacle clearance responsibilities**
- 3.1.6 Practice emergency maneuver**

## **AVIATION HIGH RISK BEHAVIORS** (Supervisors/Leaders/Commanders)

### **4. ALLOWING UNSAFE ACTS BEFORE FLIGHT**

- 4.15 Failing to establish or enforce crew endurance policies**
- 4.16 Authorizing or participating in prohibited actions such as directing or allowing aviators to fly in unacceptable weather conditions**
- 4.19 Assigning personnel to perform missions or tasks outside the capability of the aircraft or personnel (i.e., crew selection)**
- 4.21 Failing to ensure hazard maps or other area hazards are properly documented**
- 4.23 Allowing personnel to perform without correction, actions prohibited by written, oral, or commonly accepted guidelines (i.e., altitude restrictions)**

## **APPENDIX E**

### **PRIORITIZED SPECIFIC CATEGORIES OF HIGH-RISK BEHAVIOR**

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# TOP 20 HIGH RISK BEHAVIORS - SPECIFIC CATEGORY

| HRB    | HRB FREQ. |        | COST         |        | FATALITIES |        | INJURIES |        | FLAGRANT |        | %       | FLAG/FREQ | AVG %  |
|--------|-----------|--------|--------------|--------|------------|--------|----------|--------|----------|--------|---------|-----------|--------|
|        | NO.       | %      | \$           | %      | NO.        | %      | NO.      | %      | NO.      | %      |         |           |        |
| 2.1.1  | 11        | 11.34% | \$10,947,638 | 12.12% | 15         | 40.54% | 15       | 10.87% | 11       | 22.92% | 100.00% |           | 32.96% |
| 2.1.3  | 6         | 6.19%  | \$8,960,873  | 9.92%  | 7          | 18.92% | 12       | 8.70%  | 5        | 10.42% | 83.33%  |           | 22.91% |
| 2.3.3  | 3         | 3.09%  | \$1,868,516  | 2.07%  | 4          | 10.81% | 0        | 0.00%  | 3        | 6.25%  | 100.00% |           | 20.37% |
| 1.3    | 3         | 3.09%  | \$695,670    | 0.77%  | 0          | 0.00%  | 5        | 3.62%  | 3        | 6.25%  | 100.00% |           | 18.96% |
| 2.5.1  | 2         | 2.06%  | \$2,330,432  | 2.58%  | 0          | 0.00%  | 2        | 1.45%  | 2        | 4.17%  | 100.00% |           | 18.38% |
| 2.2.2  | 6         | 6.19%  | \$4,998,207  | 5.53%  | 3          | 8.11%  | 18       | 13.04% | 4        | 8.33%  | 66.67%  |           | 17.98% |
| 2.3.1  | 2         | 2.06%  | \$89,535     | 0.10%  | 0          | 0.00%  | 0        | 0.00%  | 2        | 4.17%  | 100.00% |           | 17.72% |
| 4.19   | 4         | 4.12%  | \$716,662    | 0.79%  | 0          | 0.00%  | 1        | 0.72%  | 3        | 6.25%  | 75.00%  |           | 14.48% |
| 2.3.2  | 3         | 3.09%  | \$824,250    | 0.91%  | 0          | 0.00%  | 9        | 6.52%  | 2        | 4.17%  | 66.67%  |           | 13.56% |
| 1.4    | 2         | 2.06%  | \$4,924,330  | 5.45%  | 0          | 0.00%  | 6        | 4.35%  | 1        | 2.08%  | 50.00%  |           | 10.66% |
| 1.6    | 3         | 3.09%  | \$11,388,340 | 12.61% | 1          | 2.70%  | 1        | 0.72%  | 1        | 2.08%  | 33.33%  |           | 9.09%  |
| 2.1.5  | 3         | 3.09%  | \$4,604,072  | 5.10%  | 1          | 2.70%  | 6        | 4.35%  | 1        | 2.08%  | 33.33%  |           | 8.44%  |
| 2.2.5  | 3         | 3.09%  | \$438,842    | 0.49%  | 0          | 0.00%  | 5        | 3.62%  | 1        | 2.08%  | 33.33%  |           | 7.10%  |
| 2.2.3  | 3         | 3.09%  | \$216,592    | 0.24%  | 0          | 0.00%  | 0        | 0.00%  | 1        | 2.08%  | 33.33%  |           | 6.46%  |
| 1.7    | 4         | 4.12%  | \$9,383,161  | 10.39% | 0          | 0.00%  | 8        | 5.80%  | 0        | 0.00%  | 0.00%   |           | 3.39%  |
| 2.6.4  | 3         | 3.09%  | \$6,472,137  | 7.17%  | 0          | 0.00%  | 10       | 7.25%  | 0        | 0.00%  | 0.00%   |           | 2.92%  |
| 2.6.1  | 4         | 4.12%  | \$1,577,859  | 1.75%  | 0          | 0.00%  | 5        | 3.62%  | 0        | 0.00%  | 0.00%   |           | 1.58%  |
| 2.6.2  | 4         | 4.12%  | \$2,024,022  | 2.24%  | 0          | 0.00%  | 4        | 2.90%  | 0        | 0.00%  | 0.00%   |           | 1.54%  |
| 2.6.14 | 2         | 2.06%  | \$2,499,090  | 2.77%  | 0          | 0.00%  | 1        | 0.72%  | 0        | 0.00%  | 0.00%   |           | 0.93%  |
| 1.1    | 2         | 2.06%  | \$166,041    | 0.18%  | 0          | 0.00%  | 0        | 0.00%  | 0        | 0.00%  | 0.00%   |           | 0.37%  |

| REMAINING HIGH RISK BEHAVIORS - SPECIFIC CATEGORY (CONTINUED) |           |         |              |         |            |         |          |         |          |         |             |         |
|---------------------------------------------------------------|-----------|---------|--------------|---------|------------|---------|----------|---------|----------|---------|-------------|---------|
| HRB                                                           | HRB FREQ. |         | COST         |         | FATALITIES |         | INJURIES |         | FLAGRANT |         | % FLAG/FREQ |         |
|                                                               | NO.       | %       | \$           | %       | NO.        | %       | NO.      | %       | NO.      | %       |             |         |
| 1.2                                                           | 1         | 1.03%   | \$630,221    | 0.70%   | 2          | 5.41%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 1.8                                                           | 1         | 1.03%   | \$31,536     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.1.4                                                         | 1         | 1.03%   | \$15,000     | 0.02%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| 2.1.6                                                         | 1         | 1.03%   | \$12,714     | 0.01%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| 2.2.4                                                         | 1         | 1.03%   | \$143,782    | 0.16%   | 0          | 0.00%   | 1        | 0.72%   | 0        | 0.00%   |             | 0.00%   |
| 2.3.4                                                         | 1         | 1.03%   | \$24,179     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.4.1                                                         | 1         | 1.03%   | \$1,259,389  | 1.39%   | 1          | 2.70%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.4.5                                                         | 1         | 1.03%   | \$26,268     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.5.3                                                         | 1         | 1.03%   | \$4,654,210  | 5.15%   | 0          | 0.00%   | 3        | 2.17%   | 0        | 0.00%   |             | 0.00%   |
| 2.5.4                                                         | 1         | 1.03%   | \$57,751     | 0.06%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.5.6                                                         | 1         | 1.03%   | \$349,382    | 0.39%   | 0          | 0.00%   | 2        | 1.45%   | 0        | 0.00%   |             | 0.00%   |
| 2.5.9                                                         | 1         | 1.03%   | \$21,536     | 0.02%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.6.12                                                        | 1         | 1.03%   | \$926,784    | 1.03%   | 0          | 0.00%   | 8        | 5.80%   | 0        | 0.00%   |             | 0.00%   |
| 2.6.16                                                        | 1         | 1.03%   | \$152,675    | 0.17%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| 2.6.18                                                        | 1         | 1.03%   | \$994,544    | 1.10%   | 0          | 0.00%   | 9        | 6.52%   | 0        | 0.00%   |             | 0.00%   |
| 2.6.6                                                         | 1         | 1.03%   | \$29,853     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| 2.6.7                                                         | 1         | 1.03%   | \$83,314     | 0.09%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 2.6.8                                                         | 1         | 1.03%   | \$1,848,663  | 2.05%   | 1          | 2.70%   | 3        | 2.17%   | 1        | 2.08%   |             | 100.00% |
| 3.1.4                                                         | 1         | 1.03%   | \$967,075    | 1.07%   | 0          | 0.00%   | 2        | 1.45%   | 0        | 0.00%   |             | 0.00%   |
| 3.1.6                                                         | 1         | 1.03%   | \$102,907    | 0.11%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 4.1.5                                                         | 1         | 1.03%   | \$59,003     | 0.07%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| 4.1.6                                                         | 1         | 1.03%   | \$512,176    | 0.57%   | 0          | 0.00%   | 2        | 1.45%   | 1        | 2.08%   |             | 100.00% |
| 4.2.1                                                         | 1         | 1.03%   | \$1,022,476  | 1.13%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   |             | 0.00%   |
| 4.2.3                                                         | 1         | 1.03%   | \$1,259,389  | 1.39%   | 2          | 5.41%   | 0        | 0.00%   | 1        | 2.08%   |             | 100.00% |
| Totals                                                        | 97        | 100.00% | \$90,311,096 | 100.00% | 37         | 100.00% | 138      | 100.00% | 48       | 100.00% |             |         |

# **APPENDIX F**

## **ORIGINAL AVIATOR SURVEY**

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## ORIGINAL AVIATOR SURVEY COVERSHEET

The following questions are intended to solicit your input regarding certain behaviors exhibited by Army aviation personnel. This information is being gathered as part of a study sponsored by the U.S. Army Safety Center.

Your responses will remain completely anonymous. The data will be used for assessment purposes only. This information will not become a part of your official record, nor will it be used to make any determination about you. You are not required to provide your name, social security number, or any other personal identifying data.

Please carefully complete both sections.

### SECTION A. Demographic Data

### SECTION B. Aviator Survey

[NOTE: There are four separate surveys with 10 identical queries, differing only by the statement at the top of each page. Please read the statement carefully before completing each survey.]

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## AVIATOR SURVEY

### SECTION A. Demographic Data

1. Indicate the total number of years you have been an Army aviator.

\_\_\_\_\_ years

2. Indicate the approximate number of flight hours you have accrued in Army aircraft.

\_\_\_\_\_ total

\_\_\_\_\_ rotary wing

\_\_\_\_\_ fixed wing

\_\_\_\_\_ combat

3. Indicate your age.

\_\_\_\_\_ years

4. Indicate the aircraft in which you have accrued the most flight time during your Army aviation career.

\_\_\_\_\_ mission/type/design/series

5. Check all additional qualifications/ratings you hold or have held:

Pilot in Command

Flight Lead

Unit Trainer

Instructor Pilot

Standardization Instructor Pilot

Instrument Flight Examiner

Aviation Safety Officer

Maintenance Test Pilot

Maintenance Test Flight Examiner

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Have you ever been involved in an Army Class A-C aviation accident where you were identified by the accident board as having committed an error that contributed to the accident?

Yes [ ]

No [ ]

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## AVIATOR SURVEY

### SECTION B1. SURVEY

Check the appropriate block that corresponds to the number of times (best guess) you have knowingly, and of your own volition, performed the following types of actions during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 4 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 5          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B2. SURVEY

Check the appropriate block that corresponds to the number of times you have personally observed the following types of actions committed by another aviator during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 5 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 4          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B3. SURVEY

Check the appropriate block that corresponds to the number of times someone has told you about seeing another aviator perform the following types of actions during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 5 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 5          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B4. SURVEY

Check the block that corresponds to the one most appropriate administrative action you believe would discourage the types of behavior (first offense) listed below: [Note: additional training is not appropriate]

|     |                                                                                                                                                         | Verbal counseling by the person witnessing the event | Verbal reprimand by the ASO, SIP, or commander, as appropriate | Revoke PC, UT, IP, etc., orders | Written reprimand by the commander (official file) | Disqualify from aviation service (Flight Evaluation Board) |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|---------------------------------|----------------------------------------------------|------------------------------------------------------------|
| 1.  | Flown terrain flight without fully/completely documenting hazard maps                                                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 2.  | Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 4.  | Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles                                                              | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 5.  | Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)                                | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 6.  | Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction                                                      | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 7.  | Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)                                                                             | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 8.  | Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 9.  | Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 10. | Flying without completing aircraft preflight checks                                                                                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |

## **APPENDIX G**

### **CANDIDATE RISK MANAGEMENT TECHNIQUE SURVEY**

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## Candidate Risk Management Techniques

The following survey solicits your honest and objective opinions regarding two proposed techniques to reduce the frequency of occurrence of high risk behavior (see definition and list of behaviors at Appendix C) among Army aviators with minimal impact on unit administration and normal operating procedures. These techniques were developed as part of a study entitled "Indicators of Indiscipline, Phase II", conducted for the Army Safety Center by an independent contractor. After reviewing almost 500 aviation accident cases, the researchers found that high risk behavior was involved in over 20% of the accident cases with approximately half of those cases involving flagrant (e.g., blatant, disgraceful, shocking, or outrageously evident) violations of regulations or procedures.

Please review the attached materials and answer the following questions about the two proposed techniques:

(circle your response)

|                                                                                                                                                 | <u>Education<br/>Program</u> |    | <u>Enforcement<br/>Program</u> |    | <u>Both<br/>Programs</u> |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----|--------------------------------|----|--------------------------|----|
| a. Do you believe that these techniques could be implemented at unit level with minimal impact on unit administration and operating procedures? | Yes                          | No | Yes                            | No | Yes                      | No |
| b. Would you support these techniques in your unit?                                                                                             | Yes                          | No | Yes                            | No | Yes                      | No |
| c. Do you believe other ASO's would support these techniques in their units?                                                                    | Yes                          | No | Yes                            | No | Yes                      | No |

Please indicate any suggested changes you have to improve the techniques:

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Other comments:

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### Voluntary Consent and Confidentiality Disclosure

Your participation in this survey is voluntary. Data is being collected and analyzed on a non-attribution basis. Your responses will not be identified with you personally or your unit in any way.

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## **Candidate Risk Management Techniques**

### **General**

Two high risk management techniques are deemed appropriate for implementation in aviation units and are described in the following subparagraphs. One of these techniques emphasizes education and the other emphasizes enforcement. Both techniques require aviation unit commanders to survey unit aviators to identify their perception of the safety climate within the command. Because management of high risk behavior is a cooperative effort between leaders and unit aviators, it is important to understand the unit aviator's perception of the organization's safety climate. This perception strongly influences their behavior on the job and their desire to learn from and respond to these programs. The overall safety climate of a unit can have a significant effect, both positive and negative, on individual aviator behavior. The Safety Climate Assessment Form at appendix B was developed to analyze the organization's safety climate. It should be administered to all unit aviators who have been assigned to the unit for at least six months. The completed forms should be anonymously submitted to a unit point of contact, possibly the Aviation Safety Officer, who would keep the responses confidential and provide the commander a summary. The results, which should be shared with all participants, will show how unit aviators view the safety climate and where corrective actions should be concentrated. Follow-up surveys may be appropriate to determine if progress has been made and in which areas further work is required.

### **Education Program**

The first technique involves educating commanders and unit aviators about high risk behavior (see definition and list of behaviors at appendix C). In order to use the administrative actions available to them, commanders must know precisely what constitutes HRB, each type of HRB's relative level of severity (based on costs, number of fatalities, injuries, and flagrant violations), and the appropriate corrective actions to reduce the likelihood of further occurrence. Because management of high risk behavior is both an individual (aviator) and leadership (commander) responsibility, unit aviators should also be included in this program. The matrix at appendix A portrays the various HRB's that have resulted in accidents, their severity ranking among HRB types, and suggested corrective actions. This matrix and the information

at appendices C and D should be used by commanders and safety officers to develop a short class to be given during unit level safety meetings.

### Enforcement/Reinforcement Program

The second technique requires commanders to establish positive reinforcement techniques to encourage proper behavior. In modifying behavior, psychologists suggest that tighter control over people is not the only answer. Positive reinforcement is recommended as much more effective in changing human behavior than punishment and discipline. Positive reinforcement is the act of rewarding a person for their actions in order to encourage the recurrence of the behavior. One of the most effective rewards is recognition and personal praise from the commander. For example, if a pilot in command, air mission commander, or flight leader properly determines the weather or other environmental conditions to be less than that required for successful mission accomplishment and delays or cancels the mission, the commander should publicly commend the aviator for the decision. Likewise, when a unit aviator chooses not to fly because he is fatigued or ill and this condition is confirmed by the flight surgeon, the commander should openly praise the aviator's judgement. Even when an aviator makes a mistake, i.e., improper fuel planning, but decides to land short of destination and call for assistance, the commander should emphasize the correct decision to land short versus the planning error.

Of course, when the commander learns of an aviator who has displayed HRB, he should take swift and appropriate corrective action (appendix A) and ensure all other unit aviators are aware of the infraction and the consequences. The ultimate goal of this enforcement program is to encourage each unit aviator to make on the spot corrections so that everyone understands that high risk behavior is not condoned within the unit.

## High Risk Behavior/Suggested Corrective Action Matrix

| Severity Ranking | High Risk Behavior Description                                                                                                      | Corrective Action First Offense                                                                                                                             | Corrective Action Second Offense                                                                                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                | Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles                                          | <u>Flagrant:</u> Suspend PC, UT, IP, etc. orders for six months to one year<br><u>Non-flagrant:</u> NA                                                      | <u>Flagrant:</u> Suspend the aviator from flying duty and convene a Flying Evaluation Board (FEB)<br><u>Non-flagrant:</u> NA                                                                                                   |
| 2                | Flying aircraft into illegal weather conditions or weather conditions normally considered unacceptable                              | <u>Flagrant:</u> Suspend PC, UT, IP, etc. orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand by the commander, additional training     | <u>Flagrant:</u> Official letter of reprimand from commander, revoke PC, UT, IP, etc., orders<br><u>Non-flagrant:</u> Formal counseling by the commander, suspend PC, UT, IP, etc., orders for six months                      |
| 3                | Intentionally operating aircraft so close to vegetation or terrain that strike avoidance is more a matter of luck than flying skill | <u>Flagrant:</u> Suspend PC, etc., orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand by the commander, additional training            | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc. orders for one year<br><u>Non-flagrant:</u> Formal counseling by the commander, suspend PC, UT, IP, etc. orders for three to six months |
| 4                | Flying aircraft without performing or improperly performing performance planning tasks (power, fuel, weight and balance)            | <u>Flagrant:</u> Suspend PC, etc., orders for 30 days to three months<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders, additional training | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for six months<br><u>Non-flagrant:</u> Verbal reprimand or formal counseling by the commander                                   |
| 5                | Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction                                  | <u>Flagrant:</u> Suspend PC, etc., orders for 30 days<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders, additional training                 | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand or formal counseling by the commander                          |

**High Risk Behavior/Suggested Corrective Action Matrix**

| <b>Severity Ranking</b> | <b>High Risk Behavior Description</b>                                                                                                 | <b>Corrective Action First Offense</b>                                                                                                      | <b>Corrective Action Second Offense</b>                                                                                                                                                               |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6</b>                | Exceeding airspeed, power, or RPM limitations                                                                                         | <u>Flagrant:</u> Suspend PC, etc., orders for 30 days<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders, additional training | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand or formal counseling by the commander |
| <b>7</b>                | Intentionally operating aircraft so close to another aircraft that strike avoidance is more a matter of luck than flying skill        | <u>Flagrant:</u> Suspend PC, etc., orders for 30 days<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders, additional training | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand or formal counseling by the commander |
| <b>8</b>                | Intentionally operating aircraft so close to buildings or structures that strike avoidance is more a matter of luck than flying skill | <u>Flagrant:</u> Suspend PC, etc., orders for 30 days<br><u>Non-flagrant:</u> Verbal counseling by peers/unit leaders, additional training  | <u>Flagrant:</u> Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months<br><u>Non-flagrant:</u> Verbal reprimand or formal counseling by the commander |
| <b>9</b>                | Flying terrain flight without documenting or improperly documenting hazard maps                                                       | <u>Flagrant:</u> Verbal reprimand by the commander<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders                         | <u>Flagrant:</u> Formal Counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant:</u> Formal counseling by the commander                          |
| <b>10</b>               | Flying aircraft without completing or improperly completing aircraft preflight or equipment checks                                    | <u>Flagrant:</u> Verbal reprimand by the commander<br><u>Non-flagrant:</u> Verbal counseling by peers/ unit leaders                         | <u>Flagrant:</u> Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant:</u> Formal counseling by the commander                          |

## High Risk Behavior/Suggested Corrective Action Matrix

| Severity Ranking | High Risk Behavior Description                                                                                                                                           | Corrective Action First Offense                                                                                       | Corrective Action Second Offense                                                                                                                                               |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11               | Flying while in violation of unit crew endurance policy or fatigued to the extent that performance is degraded                                                           | <u>Flagrant</u> : Verbal reprimand by the commander<br><u>Non-flagrant</u> : Verbal counseling by peers/ unit leaders | <u>Flagrant</u> : Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant</u> : Formal counseling by the commander |
| 12               | Operating in conditions conducive to loss of control (i.e., LTE)                                                                                                         | <u>Flagrant</u> : Verbal reprimand by the commander<br><u>Non-flagrant</u> : Verbal counseling by peers/ unit leaders | <u>Flagrant</u> : Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant</u> : Formal counseling by the commander |
| 13               | Exceeding fuel endurance limitations                                                                                                                                     | <u>Flagrant</u> : Verbal reprimand by the commander<br><u>Non-flagrant</u> : Verbal counseling by peers/ unit leaders | <u>Flagrant</u> : Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant</u> : Formal counseling by the commander |
| 14               | Flying aircraft without completing or improperly completing before takeoff or landing checks                                                                             | <u>Flagrant</u> : Verbal reprimand by the commander<br><u>Non-flagrant</u> : Verbal counseling by peers/ unit leaders | <u>Flagrant</u> : Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant</u> : Formal counseling by the commander |
| 15               | Failing to correctly follow procedures for specific flight profiles (i.e., NVG approach, landing/hovering in snow/dust, slope operations, or negotiating wire obstacles) | <u>Flagrant</u> : Verbal reprimand by the commander<br><u>Non-flagrant</u> : Verbal counseling by peers/ unit leaders | <u>Flagrant</u> : Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months<br><u>Non-flagrant</u> : Formal counseling by the commander |

## High Risk Behavior/Suggested Corrective Action Matrix

| Severity Ranking | High Risk Behavior Description                                                                | Corrective Action First Offense                                                                                  | Corrective Action Second Offense                                                                                                                                          |
|------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16               | Flying aircraft without completing or improperly completing mission briefing or crew briefing | <p>Flagrant: Verbal reprimand by the commander</p> <p>Non-flagrant: Verbal counseling by peers/ unit leaders</p> | <p>Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months</p> <p>Non-flagrant: Formal counseling by the commander</p> |

### Notes:

- (1) As a minimum, flagrant HRB causing an accident will result in a letter of reprimand from the commander.
- (2) As a minimum, non-flagrant HRB causing an accident will result in a suspension of PC, UT, IP, etc., orders for 30 days.
- (3) More than two instances of flagrant violations will result in a temporary suspension of PC, UT, IP, etc., orders for 30 days.
- (4) More than two instances of non-flagrant violations will result in revocation of PC, UT, IP, etc., orders.
- (5) Every flagrant violation will be brought to the commander's attention.

## SAFETY CLIMATE ASSESSMENT FORM

**General:** This form should be completed by unit personnel who have been assigned for at least six months. There is no requirement to provide any personal identifying information (i.e., name, rank, social security number, job title, etc.)

### Part I - Aviation Safety Program Climate

Indicate your assessment of the aviation safety program environment by marking the percentage of the program that is:

**% of Total Program**

- **Too Aggressive**  
(emphasized too much, overzealous, pushed too hard)
- **Effective**  
(on target, worthwhile, beneficial)
- **Vague**  
(borderline, questionable, imprecise)
- **Negligent**  
(lax, careless, delinquent)
- **Other**  
(you describe Part IV)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Total 100%**

### Part II - Unit Safety Climate Factors

Rate your unit leaders on how well they do with regard to the factors listed below:

| RATING                    |      |      |      |           |
|---------------------------|------|------|------|-----------|
| Climate Factors           | Poor | Fair | Good | Excellent |
| Confidence and trust      |      |      |      |           |
| Subordinate well being    |      |      |      |           |
| Understanding of problems |      |      |      |           |
| Training and assistance   |      |      |      |           |
| Providing support         |      |      |      |           |
| Disseminating information |      |      |      |           |
| Seeking opinions          |      |      |      |           |
| Giving recognition        |      |      |      |           |

**Part III - Unit Safety Climate Requirements**

Rate your organization on how well it satisfies the requirements listed below:

| RATING                                    |      |      |      |           |
|-------------------------------------------|------|------|------|-----------|
| Climate Requirements                      | Poor | Fair | Good | Excellent |
| Commander's involvement                   |      |      |      |           |
| Established performance criteria          |      |      |      |           |
| Awareness of performance criteria         |      |      |      |           |
| Training conducted to a standard          |      |      |      |           |
| Enforcement actions for safety violations |      |      |      |           |
| Operations by the book                    |      |      |      |           |

**Part IV - Suggestions for Improvement**

Indicate how to improve the safety climate in the unit.

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## **AVIATION HIGH RISK BEHAVIOR (HRB)**

Personnel who operate aviation equipment or who manage or supervise aviation personnel and equipment exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline) that place aviation personnel or equipment at a level of risk that exceeds that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation as well as overconfidence, lack of confidence, and self imposed fatigue and alcohol or drug abuse. High-risk behavior can be either flagrant or non-flagrant.

(Note: Some categories have been intentionally omitted.)

### **AVIATION HIGH RISK BEHAVIORS (Pilots/Copilots/CrewMembers)**

#### **1. FLYING AIRCRAFT WITHOUT PERFORMING OR IMPROPERLY PERFORMING, REQUIRED FLIGHT PLANNING TASKS**

- 1.1 Mission/crew briefing (designating crew duties/responsibilities)
- 1.2 Weather/NOTAM checks
- 1.3 Performance planning (power, fuel, weight/balance)
- 1.4 Documenting hazard maps (wires, obstructions)
- 1.5 Completing flight plans (route planning)
- 1.6 Completing aircraft preflight/equipment checks
- 1.7 Completing before takeoff/landing checks
- 1.8 Performing proper route/landing zone reconnaissance

#### **2. PERFORMING UNSAFE ACTS IN FLIGHT**

- 2.1 Unauthorized flight maneuvers/violating regulatory guidance
  - 2.1.1 Aerobatics/"buzzing" ground vehicles/return-to-target maneuvers
  - 2.1.3 Flying aircraft into unacceptable/illegal weather conditons
  - 2.1.4. Allowing nonrated personnel to fly aircraft
  - 2.1.5 Flying while fatigued or in violation of unit crew endurance policy
  - 2.1.6 Violating local traffic separation criteria
- 2.2 Operating aircraft outside of accepted flight envelope/profile
  - 2.2.2 Exceeding airspeed, power, or RPM limitations
  - 2.2.3 Exceeding fuel endurance limitations
  - 2.2.4 Exceeding other aircraft systems' limitations
  - 2.2.5 Operating in conditions conducive to Loss of Tail Rotor Effectiveness (LTE)
- 2.3 Intentionally operating aircraft unnecessarily close to objects
  - 2.3.1 Another aircraft
  - 2.3.2 Buildings/structures
  - 2.3.3 Vegetation/terrain
  - 2.3.4 External load

- 2.5 Failing to correctly follow procedures for emergency or near emergency situations**
- 2.5.1 Engine, fuel control, governor malfunctions
- 2.5.3 Flight control malfunctions
- 2.5.4 Other aircraft malfunctions
- 2.5.6 Loss of visual contact with the ground and/or obstacle
- 2.5.9 Landing gear malfunction

- 2.6 Failing to correctly follow flight procedures for specific flight profiles**
- 2.6.1 Landing/hovering in snowdust
- 2.6.2 Slope operations
- 2.6.4 Night Vision Goggle approach
- 2.6.6 Confined area takeoff
- 2.6.7 Power approach/precision landing
- 2.6.8 In-flight join-up
- 2.6.12 Takeoff in snow/dust
- 2.6.14 Negotiate wire obstacles
- 2.6.16 High overhead approach
- 2.6.18 Steep turn

- 2.4 Failing to ensure sufficient clearance from obstacles**
- 2.4.1 Crewmember was not searching/scanning
- 2.4.5 Crewmember searched, saw obstacle, but misjudged distance/closure rate/etc

### **3. ALLOWING UNSAFE ACTS IN FLIGHT**

- 3.1 Allowing copilot or other crewmembers to incorrectly perform duties**
- 3.1.4 Obstacle clearance responsibilities
- 3.1.6 Practice emergency maneuver

## **AVIATION HIGH RISK BEHAVIORS** (Supervisors/Leaders/Commanders)

- 4. ALLOWING UNSAFE ACTS BEFORE FLIGHT**
- 4.15 Failing to establish or enforce crew endurance policies
- 4.16 Authorizing or participating in prohibited actions such as directing or allowing aviators to fly in unacceptable weather conditions
- 4.19 Assigning personnel to perform missions or tasks outside the capability of the aircraft or personnel (i.e., crew selection)
- 4.21 Failing to ensure hazard maps or other area hazards are properly documented.
- 4.23 Allowing personnel to perform without correction, actions prohibited by written, oral, or commonly accepted guidelines (i.e., altitude restrictions)

# TOP 20 HIGH RISK BEHAVIORS - SPECIFIC CATEGORY

| HRB    | HRB FREQ. |        | COST         |        | FATALITIES |        | INJURIES |        | FLAGRANT |        | FLAG/FREQ | AVG %  |
|--------|-----------|--------|--------------|--------|------------|--------|----------|--------|----------|--------|-----------|--------|
|        | NO.       | %      | \$           | %      | NO.        | %      | NO.      | %      | NO.      | %      |           |        |
| 2.1.1  | 11        | 11.34% | \$10,947,638 | 12.12% | 15         | 40.54% | 15       | 10.87% | 11       | 22.92% | 100.00%   | 32.96% |
| 2.1.3  | 6         | 6.19%  | \$8,960,873  | 9.92%  | 7          | 18.92% | 12       | 8.70%  | 5        | 10.42% | 83.33%    | 22.91% |
| 2.3.3  | 3         | 3.09%  | \$1,868,516  | 2.07%  | 4          | 10.81% | 0        | 0.00%  | 3        | 6.25%  | 100.00%   | 20.37% |
| 1.3    | 3         | 3.09%  | \$695,670    | 0.77%  | 0          | 0.00%  | 5        | 3.62%  | 3        | 6.25%  | 100.00%   | 18.96% |
| 2.5.1  | 2         | 2.06%  | \$2,330,432  | 2.58%  | 0          | 0.00%  | 2        | 1.45%  | 2        | 4.17%  | 100.00%   | 18.38% |
| 2.2.2  | 6         | 6.19%  | \$4,998,207  | 5.53%  | 3          | 8.11%  | 18       | 13.04% | 4        | 8.33%  | 66.67%    | 17.98% |
| 2.3.1  | 2         | 2.06%  | \$89,535     | 0.10%  | 0          | 0.00%  | 0        | 0.00%  | 2        | 4.17%  | 100.00%   | 17.72% |
| 4.19   | 4         | 4.12%  | \$716,662    | 0.79%  | 0          | 0.00%  | 1        | 0.72%  | 3        | 6.25%  | 75.00%    | 14.48% |
| 2.3.2  | 3         | 3.09%  | \$824,250    | 0.91%  | 0          | 0.00%  | 9        | 6.52%  | 2        | 4.17%  | 66.67%    | 13.56% |
| 1.4    | 2         | 2.06%  | \$4,924,330  | 5.45%  | 0          | 0.00%  | 6        | 4.35%  | 1        | 2.08%  | 50.00%    | 10.66% |
| 1.6    | 3         | 3.09%  | \$11,388,340 | 12.61% | 1          | 2.70%  | 1        | 0.72%  | 1        | 2.08%  | 33.33%    | 9.09%  |
| 2.1.5  | 3         | 3.09%  | \$4,604,072  | 5.10%  | 1          | 2.70%  | 6        | 4.35%  | 1        | 2.08%  | 33.33%    | 8.44%  |
| 2.2.5  | 3         | 3.09%  | \$438,842    | 0.49%  | 0          | 0.00%  | 5        | 3.62%  | 1        | 2.08%  | 33.33%    | 7.10%  |
| 2.2.3  | 3         | 3.09%  | \$216,592    | 0.24%  | 0          | 0.00%  | 0        | 0.00%  | 1        | 2.08%  | 33.33%    | 6.46%  |
| 1.7    | 4         | 4.12%  | \$9,383,161  | 10.39% | 0          | 0.00%  | 8        | 5.80%  | 0        | 0.00%  | 0.00%     | 3.39%  |
| 2.6.4  | 3         | 3.09%  | \$6,472,137  | 7.17%  | 0          | 0.00%  | 10       | 7.25%  | 0        | 0.00%  | 0.00%     | 2.92%  |
| 2.6.1  | 4         | 4.12%  | \$1,577,859  | 1.75%  | 0          | 0.00%  | 5        | 3.62%  | 0        | 0.00%  | 0.00%     | 1.58%  |
| 2.6.2  | 4         | 4.12%  | \$2,024,022  | 2.24%  | 0          | 0.00%  | 4        | 2.90%  | 0        | 0.00%  | 0.00%     | 1.54%  |
| 2.6.14 | 2         | 2.06%  | \$2,499,090  | 2.77%  | 0          | 0.00%  | 1        | 0.72%  | 0        | 0.00%  | 0.00%     | 0.93%  |
| 1.1    | 2         | 2.06%  | \$166,041    | 0.18%  | 0          | 0.00%  | 0        | 0.00%  | 0        | 0.00%  | 0.00%     | 0.37%  |

# REMAINING HIGH RISK BEHAVIORS - SPECIFIC CATEGORY (CONTINUED)

| HRB    | HRB FREQ. |         | COST         |         | FATALITIES |         | INJURIES |         | FLAGRANT |         | % FLAG/FREQ |
|--------|-----------|---------|--------------|---------|------------|---------|----------|---------|----------|---------|-------------|
|        | NO.       | %       | \$           | %       | NO.        | %       | NO.      | %       | NO.      | %       |             |
| 1.2    | 1         | 1.03%   | \$630,221    | 0.70%   | 2          | 5.41%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 1.8    | 1         | 1.03%   | \$31,536     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.1.4  | 1         | 1.03%   | \$15,000     | 0.02%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| 2.1.6  | 1         | 1.03%   | \$12,714     | 0.01%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| 2.2.4  | 1         | 1.03%   | \$143,782    | 0.16%   | 0          | 0.00%   | 1        | 0.72%   | 0        | 0.00%   | 0.00%       |
| 2.3.4  | 1         | 1.03%   | \$24,179     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.4.1  | 1         | 1.03%   | \$1,259,389  | 1.39%   | 1          | 2.70%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.4.5  | 1         | 1.03%   | \$26,268     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.5.3  | 1         | 1.03%   | \$4,654,210  | 5.15%   | 0          | 0.00%   | 3        | 2.17%   | 0        | 0.00%   | 0.00%       |
| 2.5.4  | 1         | 1.03%   | \$57,751     | 0.06%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.5.6  | 1         | 1.03%   | \$349,382    | 0.39%   | 0          | 0.00%   | 2        | 1.45%   | 0        | 0.00%   | 0.00%       |
| 2.5.9  | 1         | 1.03%   | \$21,536     | 0.02%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.6.12 | 1         | 1.03%   | \$926,784    | 1.03%   | 0          | 0.00%   | 8        | 5.80%   | 0        | 0.00%   | 0.00%       |
| 2.6.16 | 1         | 1.03%   | \$152,675    | 0.17%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| 2.6.18 | 1         | 1.03%   | \$994,544    | 1.10%   | 0          | 0.00%   | 9        | 6.52%   | 0        | 0.00%   | 0.00%       |
| 2.6.6  | 1         | 1.03%   | \$29,853     | 0.03%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| 2.6.7  | 1         | 1.03%   | \$83,314     | 0.09%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 2.6.8  | 1         | 1.03%   | \$1,848,663  | 2.05%   | 1          | 2.70%   | 3        | 2.17%   | 1        | 2.08%   | 100.00%     |
| 3.1.4  | 1         | 1.03%   | \$967,075    | 1.07%   | 0          | 0.00%   | 2        | 1.45%   | 0        | 0.00%   | 0.00%       |
| 3.1.6  | 1         | 1.03%   | \$102,907    | 0.11%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 4.1.5  | 1         | 1.03%   | \$59,003     | 0.07%   | 0          | 0.00%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| 4.1.6  | 1         | 1.03%   | \$512,176    | 0.57%   | 0          | 0.00%   | 2        | 1.45%   | 1        | 2.08%   | 100.00%     |
| 4.2.1  | 1         | 1.03%   | \$1,022,476  | 1.13%   | 0          | 0.00%   | 0        | 0.00%   | 0        | 0.00%   | 0.00%       |
| 4.2.3  | 1         | 1.03%   | \$1,259,389  | 1.39%   | 2          | 5.41%   | 0        | 0.00%   | 1        | 2.08%   | 100.00%     |
| Totals | 97        | 100.00% | \$90,311,096 | 100.00% | 37         | 100.00% | 138      | 100.00% | 48       | 100.00% |             |

## **APPENDIX H**

### **RESULTS OF AVIATOR SURVEY PRETEST**

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# SURVEY PRE-TEST RESULTS

| DEMOGRAPHIC DATA |     |         |          |       |       |        |                              |           |    | SURVEY DATA |    |    |    |    |    |    |    |     |     | Survey B1 |  |  |
|------------------|-----|---------|----------|-------|-------|--------|------------------------------|-----------|----|-------------|----|----|----|----|----|----|----|-----|-----|-----------|--|--|
| A/C Type         | Age | Avn Svc | Total FT | RW FT | FW FT | CBT FT | Qualifications               | Acc Error | Q1 | Q2          | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Avg |           |  |  |
| UH1H/V           | 39  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                        | N         | 5  | 4           | 5  | 5  | 3  | 5  | 5  | 5  | 5  | 5   | 4.7 |           |  |  |
| UH1H             | 33  | 4       | 320      | 320   | 0     | 0      | NONE                         | N         | 5  | 4           | 5  | 5  | 2  | 5  | 5  | 5  | 5  | 5   | 4.6 |           |  |  |
| UH1H             | 33  | 7       | 1000     | 1000  | 0     | 0      | PC,ASO                       | N         | 4  | 2           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5   | 4.6 |           |  |  |
| UH1H             | 41  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                        | N         | 4  | 3           | 5  | 5  | 4  | 5  | 5  | 5  | 5  | 5   | 4.6 |           |  |  |
| UH1H             | 50  | 9       | 1600     | 1000  | 600   | 0      | PC,FL,ASO                    | N         | 5  | 5           | 5  | 5  | 5  | 5  | 5  | 3  | 5  | 3   | 4.6 |           |  |  |
| UH1H             | 40  | 11      | 1750     | 1600  | 150   | 0      | PC,FL,MTP                    | N         | 4  | 4           | 5  | 5  | 4  | 5  | 5  | 4  | 5  | 5   | 4.6 |           |  |  |
| UH1H             | 45  | 21      | 3000     | 2988  | 12    | 1048   | PC,FL,IP,IFE,MTP             | N         | 3  | 3           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5   | 4.6 |           |  |  |
| UH1H             | 42  | 22      | 4500     | 3000  | 1500  | 1500   | PC,FL,UT,IP                  | N         | 4  | 4           | 4  | 5  | 5  | 5  | 5  | 5  | 4  | 5   | 4.6 |           |  |  |
| UH1H             | 40  | 15      | 2000     | 2000  | 0     | 0      | PC,FL                        | N         | 4  | 4           | 4  | 5  | 5  | 5  | 5  | 4  | 5  | 4   | 4.5 |           |  |  |
| UH1H             | 47  | 20      | 6500     | 4500  | 2000  | 700    | PC,IP,MTP                    | N         | 5  | 4           | 5  | 5  | 1  | 5  | 5  | 5  | 5  | 5   | 4.5 |           |  |  |
| UH1H             | 29  | 4       | 1250     | 1200  | 50    | 0      | PC,FL,MTP                    | N         | 3  | 4           | 4  | 5  | 4  | 5  | 5  | 4  | 5  | 5   | 4.4 |           |  |  |
| UH1H             | 31  | 11      | 2800     | 2800  | 0     | 0      | PC,FL,UT,IP,SIP,IFE,ASO      | N         | 1  | 4           | 5  | 5  | 5  | 5  | 5  | 4  | 5  | 5   | 4.4 |           |  |  |
| UH1H             | 34  | 14      | 2900     | 2900  | 0     | 0      | PC,FL,UT,IP,ASO              | N         | 3  | 4           | 5  | 2  | 5  | 5  | 5  | 5  | 5  | 5   | 4.4 |           |  |  |
| OH58C            | 36  | 9       | 725      | 725   | 0     | 0      | PC,FL                        | N         | 4  | 2           | 4  | 4  | 4  | 4  | 5  | 5  | 5  | 5   | 4.3 |           |  |  |
| UH1H             | 31  | 12      | 4200     | 4000  | 200   | 0      | PC,MTP,MTE                   | N         | 5  | 2           | 5  | 5  | 2  | 5  | 5  | 4  | 5  | 5   | 4.3 |           |  |  |
| UH1H             | 35  | 7       | 950      | 950   | 0     | 0      | PC,ASO                       | N         | 3  | 2           | 5  | 5  | 2  | 5  | 5  | 5  | 5  | 5   | 4.2 |           |  |  |
| OH58A            | 32  | 8       | 900      | 900   | 0     | 0      | PC,FL                        | N         | 1  | 3           | 5  | 3  | 5  | 5  | 5  | 5  | 5  | 5   | 4.2 |           |  |  |
| UH1H             | 38  | 14      | 1200     | 1150  | 50    | 0      | PC,FL                        | Y         | 2  | 1           | 5  | 5  | 4  | 5  | 5  | 5  | 5  | 5   | 4.2 |           |  |  |
| UH1H             | 45  | 16      | 3600     | 3500  | 100   | 1200   | PC,FL,UT,IP                  | N         | 3  | 1           | 4  | 5  | 4  | 5  | 5  | 5  | 5  | 5   | 4.2 |           |  |  |
| UH1H             | 43  | 18      | 3100     | 3100  | 0     | 0      | PC,FL,UT                     | N         | 2  | 4           | 5  | 5  | 1  | 5  | 5  | 5  | 5  | 5   | 4.2 |           |  |  |
| UH60A            | 37  | 7       | 1800     | 1800  | 0     | 0      | PC,FL,MTP,MTE                | N         | 4  | 4           | 3  | 5  | 3  | 4  | 4  | 4  | 5  | 5   | 4.1 |           |  |  |
| UH1H             | 44  | 15      | 2200     | 2200  | 0     | 900    | PC,FL,UT,ASO                 | N         | 3  | 5           | 4  | 5  | 1  | 5  | 3  | 4  | 5  | 5   | 4   |           |  |  |
| CH47D            | 45  | 22      | 6500     | 4500  | 2000  | 900    | PC,FL,UT,IP,SIP,IFE,ASO, MTP | N         | 5  | 1           | 5  | 5  | 1  | 5  | 4  | 4  | 5  | 5   | 4   |           |  |  |
| OH58A            | 30  | 6       | 2600     | 2600  | 0     | 0      | PC,FL,IP,IFE                 | N         | 1  | 4           | 5  | 4  | 3  | 5  | 4  | 4  | 5  | 4   | 3.9 |           |  |  |
| OH58A            | 43  | 18      | 3000     | 3000  | 0     | 500    | PC,FL,IP                     | N         | 4  | 3           | 3  | 3  | 2  | 5  | 4  | 4  | 5  | 5   | 3.8 |           |  |  |
| OH58A            | 43  | 22      | 7800     | 5100  | 2700  | 1200   | PC,FL,UT,IP,SIP,ASO,MTP      | N         | 1  | 4           | 4  | 4  | 3  | 5  | 4  | 4  | 5  | 4   | 3.8 |           |  |  |
| UH1H/V           | 24  | 2       | 430      | 430   | 0     | 0      | NONE                         | N         | 2  | 3           | 4  | 5  | 1  | 5  | 4  | 4  | 5  | 4   | 3.7 |           |  |  |
| UH1H             | 32  | 7       | 1500     | 1500  | 0     | 0      | PC,FL,UT,ASO                 | N         | 3  | 2           | 4  | 5  | 1  | 5  | 4  | 4  | 4  | 5   | 3.7 |           |  |  |
| UH1H             | 47  | 23      | 1600     | 1600  | 0     | 850    | PC,FL                        | N         | 3  | 3           | 3  | 5  | 3  | 5  | 3  | 3  | 5  | 3   | 3.6 |           |  |  |
| UH1H             | 47  | 23      | 3000     | 3000  | 0     | 1000   | PC,FL,MTP                    | N         | 2  | 2           | 4  | 4  | 1  | 5  | 4  | 3  | 5  | 5   | 3.5 |           |  |  |
| UH1H             | 31  | 10      | 3950     | 3700  | 250   | 0      | PC,FL,UT,IP,SIP,IFE          | N         | 3  | 3           | 5  | 2  | 1  | 5  | 4  | 1  | 5  | 5   | 3.4 |           |  |  |
| UH1H             | 42  | 22      | 7000     | 6000  | 1000  | 1200   | PC,FL,IP,SIP,IFE,MTP         | N         | 1  | 3           | 4  | 5  | 1  | 5  | 4  | 3  | 4  | 4   | 3.4 |           |  |  |
| UH1H             | 44  | 14      | 4000     | 4000  | 0     | 850    | PC,FL,UT,IP,IFE              | N         | 1  | 2           | 2  | 3  | 2  | 5  | 4  | 4  | 5  | 4   | 3.2 |           |  |  |

| SURVEY PRE-TEST RESULTS (Continued) |       |         |          |        |        |        |                     |           |     |             |     |     |     |     |     |     |     |     |      |
|-------------------------------------|-------|---------|----------|--------|--------|--------|---------------------|-----------|-----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| DEMOGRAPHIC DATA                    |       |         |          |        |        |        |                     |           |     | SURVEY DATA |     |     |     |     |     |     |     |     |      |
| A/C Type                            | Age   | Avn Svc | Total FT | RW FT  | FW FT  | CBT FT | Qualifications      | Acc Error | Q1  | Q2          | Q3  | Q4  | Q5  | Q6  | Q7  | Q8  | Q9  | Q10 | Avg  |
| CH47D                               | 40    | 20      | 6000     | 5750   | 250    | 0      | PC,FL,UT,IP,SIP,MTP | N         | 1   | 1           | 5   | 4   | 1   | 5   | 5   | 5   | 4   | 1   | 3.2  |
| UH1H/V                              | 33    | 8       | 1840     | 1840   | 0      | 0      | PC,FL,UT,ASO        | N         | 1   | 3           | 3   | 5   | 1   | 5   | 3   | 2   | 5   | 3   | 3.1  |
| UH1H                                | 44    | 18      | 1355     | 1355   | 0      | 0      | PC,FL               | N         | 1   | 1           | 5   | 1   | 1   | 5   | 5   | 2   | 4   | 5   | 3    |
| UH60A                               | 31    | 6       | 1900     | 1800   | 100    | 30     | PC                  | N         | 1   | 1           | 2   | 2   | 1   | 4   | 5   | 3   | 4   | 5   | 2.8  |
| UH1H                                | 46    | 20      | 3100     | 3100   | 0      | 0      | PC                  | N         | 1   | 1           | 1   | 1   | 1   | 5   | 3   | 4   | 5   | 5   | 2.7  |
| UH1H                                | 44    | 24      | 4900     | 4900   | 0      | 1200   | PC,FL,IP,ASO,MTP    | Y         | 1   | 1           | 1   | 1   | 1   | 5   | 1   | 1   | 5   | 4   | 2.1  |
| TOTAL                               |       |         |          |        |        |        |                     |           | 109 | 111         | 162 | 163 | 104 | 193 | 170 | 158 | 188 | 179 | 3.94 |
| HIGH                                | 50    | 24      | 7800     | 6000   | 2700   | 1500   |                     |           |     |             |     |     |     |     |     |     |     |     |      |
| LOW                                 | 24    | 2       | 320      | 320    | 0      | 0      |                     |           |     |             |     |     |     |     |     |     |     |     |      |
| MEAN                                | 38.74 | 13.46   | 2789     | 2507.9 | 281.08 | 335.33 |                     |           |     |             |     |     |     |     |     |     |     |     |      |
| MEDIAN                              | 40    | 12      |          |        |        |        |                     |           |     |             |     |     |     |     |     |     |     |     |      |

# SURVEY PRE-TEST RESULTS

| DEMOGRAPHIC DATA |     |         |          |       |       |        |                              |           |    |    |    |    | SURVEY DATA |    |    |    |    |     |     |  |  |  | Survey B2 |  |
|------------------|-----|---------|----------|-------|-------|--------|------------------------------|-----------|----|----|----|----|-------------|----|----|----|----|-----|-----|--|--|--|-----------|--|
| A/C Type         | Age | Avg Svc | Total FT | RW FT | FW FT | CBT FT | Qualifications               | Acc Error | Q1 | Q2 | Q3 | Q4 | Q5          | Q6 | Q7 | Q8 | Q9 | Q10 | Avg |  |  |  |           |  |
| UH1H             | 45  | 21      | 3000     | 2988  | 12    | 1048   | PC,FL,IP,IFE,MTP             | N         | 5  | 5  | 5  | 5  | 5           | 5  | 5  | 5  | 5  | 5   | 5   |  |  |  |           |  |
| UH1H             | 41  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                        | N         | 5  | 3  | 5  | 4  | 5           | 5  | 5  | 5  | 5  | 5   | 4.7 |  |  |  |           |  |
| OH58A            | 43  | 18      | 3000     | 3000  | 0     | 500    | PC,FL,IP                     | N         | 4  | 4  | 4  | 4  | 5           | 5  | 5  | 4  | 5  | 5   | 4.5 |  |  |  |           |  |
| UH1H             | 33  | 4       | 320      | 320   | 0     | 0      | NONE                         | N         | 5  | 3  | 5  | 5  | 1           | 5  | 5  | 5  | 5  | 5   | 4.4 |  |  |  |           |  |
| OH58A            | 32  | 8       | 900      | 900   | 0     | 0      | PC,FL                        | N         | 1  | 4  | 5  | 5  | 5           | 5  | 4  | 5  | 5  | 5   | 4.4 |  |  |  |           |  |
| UH1H             | 40  | 11      | 1750     | 1600  | 150   | 0      | PC,FL,MTP                    | N         | 5  | 5  | 4  | 4  | 5           | 5  | 4  | 4  | 4  | 4   | 4.4 |  |  |  |           |  |
| UH1H             | 42  | 22      | 4500     | 3000  | 1500  | 1500   | PC,FL,UT,IP                  | N         | 4  | 4  | 5  | 4  | 4           | 5  | 5  | 5  | 4  | 4   | 4.4 |  |  |  |           |  |
| UH1H/V           | 24  | 2       | 430      | 430   | 0     | 0      | NONE                         | N         | 3  | 5  | 4  | 4  | 5           | 5  | 4  | 4  | 5  | 4   | 4.3 |  |  |  |           |  |
| OH58C            | 36  | 9       | 725      | 725   | 0     | 0      | PC,FL                        | N         | 4  | 3  | 5  | 4  | 4           | 4  | 5  | 4  | 5  | 4   | 4.3 |  |  |  |           |  |
| UH1H             | 31  | 11      | 2800     | 2800  | 0     | 0      | PC,FL,UT,IP,SIP,IFE,ASO      | N         | 1  | 4  | 5  | 5  | 4           | 5  | 5  | 5  | 4  | 5   | 4.3 |  |  |  |           |  |
| UH1H/V           | 39  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                        | N         | 4  | 5  | 4  | 5  | 2           | 5  | 5  | 3  | 5  | 4   | 4.2 |  |  |  |           |  |
| UH1H             | 43  | 18      | 3100     | 3100  | 0     | 0      | PC,FL,UT                     | N         | 3  | 4  | 5  | 3  | 4           | 5  | 4  | 5  | 4  | 5   | 4.2 |  |  |  |           |  |
| UH1H             | 34  | 14      | 2900     | 2900  | 0     | 0      | PC,FL,UT,IP,ASO              | N         | 3  | 4  | 5  | 3  | 5           | 4  | 4  | 4  | 4  | 5   | 4.1 |  |  |  |           |  |
| UH1H             | 40  | 15      | 2000     | 2000  | 0     | 0      | PC,FL                        | N         | 3  | 4  | 4  | 4  | 4           | 4  | 4  | 4  | 4  | 4   | 4   |  |  |  |           |  |
| UH1H             | 32  | 7       | 1500     | 1500  | 0     | 0      | PC,FL,UT,ASO                 | N         | 4  | 3  | 5  | 5  | 2           | 5  | 2  | 3  | 5  | 5   | 3.9 |  |  |  |           |  |
| UH1H             | 35  | 7       | 950      | 950   | 0     | 0      | PC,ASO                       | N         | 1  | 1  | 5  | 4  | 4           | 4  | 5  | 3  | 5  | 5   | 3.8 |  |  |  |           |  |
| UH1H             | 38  | 14      | 1200     | 1150  | 50    | 0      | PC,FL                        | Y         | 1  | 1  | 5  | 4  | 4           | 5  | 4  | 4  | 5  | 4   | 3.7 |  |  |  |           |  |
| UH1H             | 47  | 20      | 6500     | 4500  | 2000  | 700    | PC,IP,MTP                    | N         | 5  | 2  | 3  | 4  | 1           | 5  | 4  | 3  | 5  | 5   | 3.7 |  |  |  |           |  |
| UH1H             | 33  | 7       | 1000     | 1000  | 0     | 0      | PC,ASO                       | N         | 1  | 1  | 3  | 4  | 4           | 4  | 5  | 4  | 5  | 4   | 3.6 |  |  |  |           |  |
| UH1H             | 31  | 12      | 4200     | 4000  | 200   | 0      | PC,MTP,MIFE                  | N         | 2  | 2  | 5  | 5  | 1           | 5  | 4  | 4  | 4  | 4   | 3.6 |  |  |  |           |  |
| OH58A            | 43  | 22      | 7800     | 5100  | 2700  | 1200   | PC,FL,UT,IP,SIP,ASO,MTP      | N         | 2  | 4  | 4  | 4  | 4           | 4  | 4  | 2  | 4  | 4   | 3.6 |  |  |  |           |  |
| UH1H             | 47  | 23      | 1600     | 1600  | 0     | 850    | PC,FL                        | N         | 3  | 3  | 3  | 5  | 3           | 5  | 3  | 5  | 3  | 3   | 3.6 |  |  |  |           |  |
| UH60A            | 37  | 7       | 1800     | 1800  | 0     | 0      | PC,FL,MTP,MIFE               | N         | 3  | 3  | 3  | 3  | 2           | 4  | 4  | 3  | 5  | 5   | 3.5 |  |  |  |           |  |
| UH1H             | 45  | 16      | 3600     | 3500  | 100   | 1200   | PC,FL,UT,IP                  | N         | 4  | 2  | 4  | 4  | 1           | 5  | 4  | 1  | 5  | 5   | 3.5 |  |  |  |           |  |
| UH1H             | 29  | 4       | 1250     | 1200  | 50    | 0      | PC,FL,MTP                    | N         | 3  | 3  | 3  | 5  | 1           | 5  | 4  | 4  | 5  | 1   | 3.4 |  |  |  |           |  |
| UH1H             | 44  | 18      | 1355     | 1355  | 0     | 0      | PC,FL                        | N         | 1  | 1  | 5  | 1  | 5           | 5  | 5  | 3  | 4  | 4   | 3.4 |  |  |  |           |  |
| OH58A            | 30  | 6       | 2600     | 2600  | 0     | 0      | PC,FL,IP,IFE                 | N         | 3  | 2  | 5  | 4  | 2           | 5  | 2  | 3  | 4  | 3   | 3.3 |  |  |  |           |  |
| UH1H             | 44  | 15      | 2200     | 2200  | 0     | 900    | PC,FL,UT,ASO                 | N         | 3  | 5  | 2  | 3  | 2           | 5  | 3  | 3  | 5  | 2   | 3.3 |  |  |  |           |  |
| UH1H             | 50  | 9       | 1600     | 1000  | 600   | 0      | PC,FL,ASO                    | N         | 3  | 1  | 3  | 3  | 3           | 3  | 4  | 2  | 4  | 3   | 3   |  |  |  |           |  |
| CH47D            | 45  | 22      | 6500     | 4500  | 2000  | 900    | PC,FL,UT,IP,SIP,IFE,ASO, MTP | N         | 4  | 1  | 5  | 4  | 1           | 1  | 4  | 1  | 4  | 4   | 2.9 |  |  |  |           |  |
| UH1H             | 47  | 23      | 3000     | 3000  | 0     | 1000   | PC,FL,MTP                    | N         | 2  | 2  | 3  | 1  | 1           | 1  | 5  | 4  | 3  | 4   | 2.8 |  |  |  |           |  |
| UH1H/V           | 33  | 8       | 1840     | 1840  | 0     | 0      | PC,FL,UT,ASO                 | N         | 1  | 1  | 4  | 2  | 1           | 5  | 5  | 5  | 1  | 5   | 2.6 |  |  |  |           |  |
| UH1H             | 31  | 10      | 3950     | 3700  | 250   | 0      | PC,FL,UT,IP,SIP,IFE          | N         | 1  | 2  | 3  | 2  | 1           | 4  | 4  | 1  | 4  | 4   | 2.6 |  |  |  |           |  |

| SURVEY PRE-TEST RESULTS (Continued) |       |         |          |        |        |        |                      |           |     |             |     |     |     |     |     |     |     |     |      |  |
|-------------------------------------|-------|---------|----------|--------|--------|--------|----------------------|-----------|-----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| DEMOGRAPHIC DATA                    |       |         |          |        |        |        |                      |           |     | SURVEY DATA |     |     |     |     |     |     |     |     |      |  |
| A/C Type                            | Age   | Avn Svc | Total FT | RW FT  | FW FT  | CBT FT | Qualifications       | Acc Error | O1  | O2          | O3  | O4  | O5  | O6  | O7  | O8  | O9  | O10 | Avg  |  |
| UHHH                                | 46    | 20      | 3100     | 3100   | 0      | 0      | PC                   | N         | 1   | 3           | 1   | 1   | 1   | 5   | 3   | 3   | 5   | 3   | 2.6  |  |
| UHHH                                | 42    | 22      | 7000     | 6000   | 1000   | 1200   | PC,FL,IP,SIP,IFE,MTP | N         | 1   | 1           | 4   | 4   | 1   | 4   | 3   | 1   | 4   | 3   | 2.6  |  |
| UHHH                                | 44    | 14      | 4000     | 4000   | 0      | 850    | PC,FL,UT,IP,IFE      | N         | 1   | 1           | 1   | 2   | 1   | 5   | 3   | 2   | 5   | 2   | 2.3  |  |
| UHHH                                | 44    | 24      | 4900     | 4900   | 0      | 1200   | PC,FL,IP,ASO,MTP     | Y         | 1   | 1           | 1   | 1   | 4   | 5   | 3   | 1   | 5   | 4   | 2.6  |  |
| UH60A                               | 31    | 6       | 1900     | 1800   | 100    | 30     | PC                   | N         | 1   | 1           | 2   | 2   | 1   | 2   | 3   | 2   | 3   | 3   | 2    |  |
| CH47D                               | 40    | 20      | 6000     | 5750   | 250    | 0      | PC,FL,UT,IP,SIP,MTP  | N         | 1   | 1           | 5   | 3   | 1   | 1   | 3   | 1   | 1   | 1   | 1.8  |  |
| TOTAL                               |       |         |          |        |        |        |                      |           | 103 | 105         | 152 | 139 | 110 | 177 | 152 | 129 | 172 | 150 | 3.56 |  |
| HIGH                                | 50    | 24      | 7800     | 6000   | 2700   | 1500   |                      |           |     |             |     |     |     |     |     |     |     |     |      |  |
| LOW                                 | 24    | 2       | 320      | 320    | 0      | 0      |                      |           |     |             |     |     |     |     |     |     |     |     |      |  |
| MEAN                                | 38.74 | 13.46   | 2789     | 2507.9 | 281.08 | 335.33 |                      |           |     |             |     |     |     |     |     |     |     |     |      |  |

# SURVEY PRE-TEST RESULTS

| DEMOGRAPHIC DATA |     |         |          |       |       |        |                             |           |    |    |    |    | SURVEY DATA |    |    |    |    |     |     |     |  |  | Survey B3 |  |  |
|------------------|-----|---------|----------|-------|-------|--------|-----------------------------|-----------|----|----|----|----|-------------|----|----|----|----|-----|-----|-----|--|--|-----------|--|--|
| A/C Type         | Age | Avg Svc | Total FT | RW FT | FW FT | CBT FT | Qualifications              | Acc Error | Q1 | Q2 | Q3 | Q4 | Q5          | Q6 | Q7 | Q8 | Q9 | Q10 | Avg |     |  |  |           |  |  |
| UH1H/V           | 24  | 2       | 430      | 430   | 0     | 0      | NONE                        | N         | 5  | 4  | 5  | 5  | 5           | 5  | 5  | 5  | 5  | 5   | 4.9 |     |  |  |           |  |  |
| UH1H             | 45  | 21      | 3000     | 2988  | 12    | 1048   | PC,FL,IP,IFE,MTP            | N         | 5  | 3  | 5  | 5  | 5           | 5  | 5  | 5  | 5  | 5   | 4.8 |     |  |  |           |  |  |
| UH1H             | 41  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                       | N         | 5  | 3  | 5  | 4  | 5           | 5  | 4  | 5  | 5  | 5   | 4.6 |     |  |  |           |  |  |
| UH1H/V           | 39  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                       | N         | 4  | 5  | 5  | 4  | 5           | 5  | 4  | 4  | 5  | 5   | 4.6 |     |  |  |           |  |  |
| OH58C            | 36  | 9       | 725      | 725   | 0     | 0      | PC,FL                       | N         | 4  | 4  | 4  | 5  | 4           | 5  | 5  | 5  | 5  | 5   | 4.6 |     |  |  |           |  |  |
| UH1H             | 40  | 11      | 1750     | 1600  | 150   | 0      | PC,FL,MTP                   | N         | 5  | 4  | 5  | 4  | 4           | 5  | 4  | 4  | 5  | 5   | 4.5 |     |  |  |           |  |  |
| UH1H             | 35  | 7       | 950      | 950   | 0     | 0      | PC,ASO                      | N         | 5  | 1  | 5  | 4  | 5           | 5  | 4  | 5  | 5  | 5   | 4.4 |     |  |  |           |  |  |
| UH1H             | 31  | 12      | 4200     | 4000  | 200   | 0      | PC,MTP,MTFE                 | N         | 5  | 5  | 4  | 4  | 4           | 4  | 4  | 4  | 5  | 5   | 4.4 |     |  |  |           |  |  |
| UH1H             | 43  | 18      | 3100     | 3100  | 0     | 0      | PC,FL,UT                    | N         | 4  | 3  | 5  | 4  | 5           | 5  | 4  | 5  | 4  | 5   | 4.4 |     |  |  |           |  |  |
| UH1H             | 29  | 4       | 1250     | 1200  | 50    | 0      | PC,FL,MTP                   | N         | 5  | 3  | 3  | 5  | 4           | 5  | 5  | 4  | 5  | 4   | 4.3 |     |  |  |           |  |  |
| UH1H             | 34  | 14      | 2900     | 2900  | 0     | 0      | PC,FL,UT,IP,ASO             | N         | 5  | 3  | 4  | 4  | 5           | 5  | 4  | 4  | 5  | 4   | 4.3 |     |  |  |           |  |  |
| UH1H             | 44  | 24      | 4900     | 4900  | 0     | 1200   | PC,FL,IP,ASO,MTP            | Y         | 4  | 4  | 4  | 4  | 4           | 5  | 4  | 4  | 5  | 5   | 4.3 |     |  |  |           |  |  |
| UH1H             | 33  | 4       | 320      | 320   | 0     | 0      | NONE                        | N         | 5  | 2  | 5  | 4  | 1           | 5  | 5  | 5  | 5  | 5   | 4.2 |     |  |  |           |  |  |
| UH1H             | 42  | 22      | 4500     | 3000  | 1500  | 1500   | PC,FL,UT,IP                 | N         | 5  | 4  | 4  | 4  | 4           | 4  | 5  | 4  | 4  | 4   | 4.2 |     |  |  |           |  |  |
| UH1H             | 45  | 16      | 3600     | 3500  | 100   | 1200   | PC,FL,UT,IP                 | N         | 4  | 5  | 5  | 3  | 1           | 5  | 5  | 2  | 5  | 5   | 5   |     |  |  |           |  |  |
| UH1H             | 46  | 20      | 3100     | 3100  | 0     | 0      | PC                          | N         | 4  | 5  | 3  | 3  | 4           | 4  | 4  | 4  | 4  | 4   | 5   |     |  |  |           |  |  |
| OH58A            | 30  | 6       | 2600     | 2600  | 0     | 0      | PC,FL,IP,IFE                | N         | 4  | 4  | 5  | 4  | 3           | 5  | 5  | 3  | 3  | 5   | 3.9 |     |  |  |           |  |  |
| OH58A            | 32  | 8       | 900      | 900   | 0     | 0      | PC,FL                       | N         | 1  | 4  | 3  | 3  | 5           | 5  | 5  | 3  | 5  | 5   | 3.9 |     |  |  |           |  |  |
| UH1H             | 47  | 23      | 1600     | 1600  | 0     | 850    | PC,FL                       | N         | 5  | 5  | 4  | 4  | 4           | 5  | 5  | 3  | 3  | 3   | 3.9 |     |  |  |           |  |  |
| UH1H             | 32  | 7       | 1500     | 1500  | 0     | 0      | PC,FL,UT,ASO                | N         | 5  | 2  | 4  | 4  | 2           | 5  | 5  | 3  | 5  | 5   | 3.8 |     |  |  |           |  |  |
| UH1H             | 40  | 15      | 2000     | 2000  | 0     | 0      | PC,FL                       | N         | 3  | 4  | 4  | 3  | 4           | 4  | 4  | 4  | 4  | 4   | 3.8 |     |  |  |           |  |  |
| UH1H             | 44  | 18      | 1355     | 1355  | 0     | 0      | PC,FL                       | N         | 4  | 3  | 5  | 4  | 5           | 5  | 3  | 2  | 3  | 4   | 3.8 |     |  |  |           |  |  |
| UH1H             | 31  | 11      | 2800     | 2800  | 0     | 0      | PC,FL,UT,IP,SIP,IFE,ASO     | N         | 1  | 4  | 4  | 4  | 4           | 4  | 4  | 5  | 3  | 4   | 3.7 |     |  |  |           |  |  |
| UH1H             | 33  | 7       | 1000     | 1000  | 0     | 0      | PC,ASO                      | N         | 4  | 1  | 4  | 4  | 4           | 3  | 5  | 4  | 5  | 1   | 3.4 |     |  |  |           |  |  |
| OH58A            | 43  | 18      | 3000     | 3000  | 0     | 500    | PC,FL,IP                    | N         | 3  | 3  | 3  | 3  | 4           | 4  | 4  | 3  | 4  | 4   | 3.4 |     |  |  |           |  |  |
| OH58A            | 43  | 22      | 7800     | 5100  | 2700  | 1200   | PC,FL,UT,IP,SIP,ASO,MTP     | N         | 5  | 4  | 3  | 1  | 4           | 4  | 4  | 1  | 4  | 4   | 3.4 |     |  |  |           |  |  |
| UH60A            | 37  | 7       | 1800     | 1800  | 0     | 0      | PC,FL,MTP,MTFE              | N         | 3  | 2  | 3  | 3  | 3           | 3  | 4  | 4  | 1  | 5   | 3.2 |     |  |  |           |  |  |
| UH1H             | 47  | 20      | 6500     | 4500  | 2000  | 700    | PC,IP,MTP                   | N         | 5  | 1  | 2  | 2  | 1           | 4  | 4  | 4  | 4  | 4   | 3   |     |  |  |           |  |  |
| UH1H             | 44  | 14      | 4000     | 4000  | 0     | 850    | PC,FL,UT,IP,IFE             | N         | 4  | 1  | 4  | 3  | 3           | 3  | 4  | 2  | 3  | 3   | 2.9 |     |  |  |           |  |  |
| UH1H             | 38  | 14      | 1200     | 1150  | 50    | 0      | PC,FL                       | Y         | 1  | 1  | 3  | 2  | 4           | 2  | 3  | 3  | 4  | 4   | 2.7 |     |  |  |           |  |  |
| UH1H             | 42  | 22      | 7000     | 6000  | 1000  | 1200   | PC,FL,IP,SIP,IFE,MTP        | N         | 2  | 1  | 3  | 3  | 1           | 4  | 1  | 2  | 4  | 3   | 2.4 |     |  |  |           |  |  |
| UH1H/V           | 33  | 8       | 1840     | 1840  | 0     | 0      | PC,FL,UT,ASO                | N         | 3  | 3  | 3  | 1  | 1           | 1  | 5  | 2  | 1  | 3   | 1   | 2.3 |  |  |           |  |  |
| CH47D            | 45  | 22      | 6500     | 4500  | 2000  | 900    | PC,FL,UT,IP,SIP,IFE,ASO,MTP | N         | 4  | 3  | 2  | 2  | 1           | 1  | 1  | 4  | 4  | 4   | 1   | 2.3 |  |  |           |  |  |

| SURVEY PRE-TEST RESULTS (Continued) |       |         |          |        |        |        |                     |           |     |             |     |     |     |     |     |     |     |     |      |  |  |  |
|-------------------------------------|-------|---------|----------|--------|--------|--------|---------------------|-----------|-----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|--|
| DEMOGRAPHIC DATA                    |       |         |          |        |        |        |                     |           |     | SURVEY DATA |     |     |     |     |     |     |     |     |      |  |  |  |
| A/C Type                            | Age   | Avn Svc | Total FT | RW FT  | FW FT  | CBT FT | Qualifications      | Acc Error | O1  | O2          | O3  | O4  | O5  | O6  | O7  | O8  | O9  | O10 | Avg  |  |  |  |
| UH1H                                | 31    | 10      | 3950     | 3700   | 250    | 0      | PC,FL,UT,IP,SIP,IFE | N         | 3   | 1           | 2   | 2   | 2   | 3   | 1   | 1   | 3   | 4   | 2.2  |  |  |  |
| UH1H                                | 44    | 15      | 2200     | 2200   | 0      | 900    | PC,FL,UT,ASO        | N         | 2   | 2           | 1   | 2   | 1   | 5   | 1   | 2   | 5   | 1   | 2.2  |  |  |  |
| UH1H                                | 47    | 23      | 3000     | 3000   | 0      | 1000   | PC,FL,MTP           | N         | 1   | 1           | 2   | 1   | 1   | 4   | 3   | 1   | 3   | 1   | 1.8  |  |  |  |
| UH60A                               | 31    | 6       | 1900     | 1800   | 100    | 30     | PC                  | N1        | 1   | 1           | 1   | 1   | 1   | 2   | 1   | 1   | 2   | 2   | 1.3  |  |  |  |
| CH47D                               | 40    | 20      | 6000     | 5750   | 250    | 0      | PC,FL,UT,IP,SIP,MTP | N         | 1   | 1           | 1   | 1   | 1   | 2   | 2   | 1   | 2   | 1   | 1.3  |  |  |  |
| UH1H                                | 50    | 9       | 1600     | 1000   | 600    | 0      | PC,FL,ASO           | N         | 1   | 1           | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    |  |  |  |
| TOTAL                               |       |         |          |        |        |        |                     |           | 140 | 111         | 138 | 124 | 124 | 165 | 136 | 117 | 162 | 144 | 3.51 |  |  |  |
| HIGH                                | 50    | 24      | 7800     | 6000   | 2700   | 1500   |                     |           |     |             |     |     |     |     |     |     |     |     |      |  |  |  |
| LOW                                 | 24    | 2       | 320      | 320    | 0      | 0      |                     |           |     |             |     |     |     |     |     |     |     |     |      |  |  |  |
| MEAN                                | 38.74 | 13.46   | 2789     | 2507.9 | 281.08 | 335.33 |                     |           |     |             |     |     |     |     |     |     |     |     |      |  |  |  |

# SURVEY PRE-TEST RESULTS

| DEMOGRAPHIC DATA |     |         |          |       |       |        |                              |           |    | SURVEY DATA |    |    |    |    |    |    |    |     |     | Survey B4 |  |  |
|------------------|-----|---------|----------|-------|-------|--------|------------------------------|-----------|----|-------------|----|----|----|----|----|----|----|-----|-----|-----------|--|--|
| A/C Type         | Age | Avn Svc | Total FT | RW FT | FW FT | CBT FT | Qualifications               | Acc Error | O1 | O2          | O3 | O4 | O5 | O6 | O7 | O8 | O9 | O10 | Avg |           |  |  |
| OH58A            | 32  | 8       | 900      | 900   | 0     | 0      | PC,FL                        | N         | 3  | 3           | 3  | 4  | 4  | 3  | 4  | 4  | 4  | 4   | 3.6 |           |  |  |
| CH47D            | 40  | 20      | 6000     | 5750  | 250   | 0      | PC,FL,UT,IP,SIP,MTP          | N         | 2  | 3           | 5  | 5  | 2  | 3  | 3  | 5  | 5  | 3   | 3.6 |           |  |  |
| OH58A            | 43  | 18      | 3000     | 3000  | 0     | 500    | PC,FL,IP                     | N         | 3  | 2           | 3  | 4  | 3  | 3  | 4  | 5  | 5  | 3   | 3.5 |           |  |  |
| UH1H             | 43  | 18      | 3100     | 3100  | 0     | 0      | PC,FL,UT                     | N         | 3  | 4           | 3  | 3  | 4  | 3  | 3  | 3  | 5  | 3   | 3.4 |           |  |  |
| UH1H             | 38  | 14      | 1200     | 1150  | 50    | 0      | PC,FL                        | Y         | 2  | 2           | 4  | 5  | 2  | 3  | 4  | 3  | 5  | 3   | 3.3 |           |  |  |
| OH58C            | 36  | 9       | 725      | 725   | 0     | 0      | PC,FL                        | N         | 3  | 2           | 2  | 4  | 3  | 3  | 4  | 4  | 4  | 3   | 3.2 |           |  |  |
| UH1H/V           | 24  | 2       | 430      | 430   | 0     | 0      | NONE                         | N         | 3  | 2           | 3  | 5  | 3  | 5  | 2  | 2  | 5  | 1   | 3.1 |           |  |  |
| UH1H             | 34  | 14      | 2900     | 2900  | 0     | 0      | PC,FL,UT,IP,ASO              | N         | 2  | 2           | 4  | 2  | 1  | 3  | 4  | 3  | 5  | 3   | 2.9 |           |  |  |
| CH47D            | 45  | 22      | 6500     | 4500  | 2000  | 900    | PC,FL,UT,IP,SIP,IFE,ASO, MTP | N         | 3  | 2           | 3  | 4  | 2  | 3  | 3  | 3  | 3  | 3   | 2.9 |           |  |  |
| UH1H             | 35  | 7       | 950      | 950   | 0     | 0      | PC,ASO                       | N         | 1  | 2           | 3  | 4  | 1  | 3  | 4  | 4  | 5  | 1   | 2.8 |           |  |  |
| UH1H             | 33  | 7       | 1000     | 1000  | 0     | 0      | PC,ASO                       | N         | 2  | 2           | 3  | 3  | 2  | 3  | 3  | 3  | 5  | 2   | 2.8 |           |  |  |
| UH1H/V           | 39  | 8       | 1000     | 1000  | 0     | 0      | PC,FL                        | N         | 2  | 2           | 3  | 3  | 2  | 3  | 2  | 3  | 5  | 3   | 2.8 |           |  |  |
| UH1H             | 31  | 11      | 2800     | 2800  | 0     | 0      | PC,FL,UT,IP,SIP,IFE,ASO      | N         | 2  | 3           | 2  | 3  | 3  | 3  | 5  | 3  | 1  | 3   | 2.8 |           |  |  |
| UH1H             | 33  | 4       | 320      | 320   | 0     | 0      | NONE                         | N         | 2  | 2           | 3  | 3  | 1  | 4  | 3  | 3  | 4  | 2   | 2.7 |           |  |  |
| UH1H             | 42  | 22      | 7000     | 6000  | 1000  | 1200   | PC,FL,IP,SIP,IFE,MTP         | N         | 2  | 2           | 2  | 3  | 2  | 3  | 3  | 3  | 4  | 3   | 2.7 |           |  |  |
| UH1H             | 50  | 9       | 1600     | 1000  | 600   | 0      | PC,FL,ASO                    | N         | 2  | 2           | 3  | 4  | 1  | 2  | 4  | 2  | 4  | 2   | 2.6 |           |  |  |
| UH1H             | 42  | 22      | 4500     | 3000  | 1500  | 1500   | PC,FL,UT,IP                  | N         | 1  | 2           | 3  | 4  | 3  | 1  | 4  | 4  | 3  | 1   | 2.6 |           |  |  |
| UH60A            | 37  | 7       | 1800     | 1800  | 0     | 0      | PC,FL,MTP,MTE                | N         | 2  | 2           | 3  | 4  | 2  | 2  | 2  | 2  | 3  | 3   | 2.5 |           |  |  |
| UH1H             | 44  | 14      | 4000     | 4000  | 0     | 850    | PC,FL,UT,IP,IFE              | N         | 2  | 2           | 2  | 3  | 2  | 2  | 3  | 3  | 4  | 2   | 2.5 |           |  |  |
| UH1H             | 46  | 20      | 3100     | 3100  | 0     | 0      | PC                           | N         | 2  | 2           | 2  | 2  | 2  | 3  | 3  | 2  | 3  | 4   | 2.5 |           |  |  |
| UH1H             | 45  | 21      | 3000     | 2988  | 12    | 1048   | PC,FL,IP,IFE,MTP             | N         | 2  | 2           | 3  | 3  | 2  | 2  | 3  | 2  | 3  | 3   | 2.5 |           |  |  |
| UH1H             | 40  | 15      | 2000     | 2000  | 0     | 0      | PC,FL                        | N         | 2  | 2           | 1  | 3  | 2  | 3  | 2  | 3  | 3  | 3   | 2.4 |           |  |  |
| OH58A            | 43  | 22      | 7800     | 5100  | 2700  | 1200   | PC,FL,UT,IP,SIP,ASO,MTP      | N         | 2  | 2           | 1  | 3  | 1  | 2  | 3  | 3  | 4  | 3   | 2.4 |           |  |  |
| UH1H             | 45  | 16      | 3600     | 3500  | 100   | 1200   | PC,FL,UT,IP                  | N         | 1  | 2           | 3  | 3  | 1  | 2  | 3  | 2  | 3  | 3   | 2.3 |           |  |  |
| UH1H             | 44  | 18      | 1355     | 1355  | 0     | 0      | PC,FL                        | N         | 2  | 1           | 3  | 3  | 2  | 3  | 3  | 3  | 2  | 1   | 2.3 |           |  |  |
| UH1H             | 44  | 24      | 4900     | 4900  | 0     | 1200   | PC,FL,IP,ASO,MTP             | Y         | 2  | 2           | 2  | 3  | 2  | 3  | 2  | 2  | 3  | 2   | 2.3 |           |  |  |
| UH1H/V           | 33  | 8       | 1840     | 1840  | 0     | 0      | PC,FL,UT,ASO                 | N         | 2  | 1           | 2  | 5  | 2  | 1  | 2  | 2  | 3  | 2   | 2.2 |           |  |  |
| UH1H             | 40  | 11      | 1750     | 1600  | 150   | 0      | PC,FL,MTP                    | N         | 2  | 3           | 1  | 3  | 1  | 2  | 3  | 1  | 3  | 3   | 2.2 |           |  |  |
| UH1H             | 47  | 20      | 6500     | 4500  | 2000  | 700    | PC,IP,MTP                    | N         | 2  | 1           | 1  | 3  | 2  | 1  | 4  | 2  | 3  | 3   | 2.2 |           |  |  |
| UH1H             | 47  | 23      | 3000     | 3000  | 0     | 1000   | PC,FL,MTP                    | N         | 1  | 1           | 2  | 3  | 3  | 3  | 1  | 2  | 3  | 3   | 2.2 |           |  |  |
| UH1H             | 29  | 4       | 1250     | 1200  | 50    | 0      | PC,FL,MTP                    | N         | 1  | 1           | 1  | 4  | 2  | 1  | 3  | 2  | 4  | 2   | 2.1 |           |  |  |
| OH58A            | 30  | 6       | 2600     | 2600  | 0     | 0      | PC,FL,IP,IFE                 | N         | 1  | 2           | 3  | 2  | 1  | 3  | 1  | 2  | 3  | 2   | 2   |           |  |  |
| UH60A            | 31  | 6       | 1900     | 1800  | 100   | 30     | PC                           | N         | 1  | 1           | 2  | 2  | 2  | 2  | 1  | 3  | 3  | 3   | 2   |           |  |  |

| SURVEY PRE-TEST RESULTS (Continued) |       |         |          |        |        |        |                     |           |    |             |    |     |    |    |     |     |     |     |      |           |  |  |
|-------------------------------------|-------|---------|----------|--------|--------|--------|---------------------|-----------|----|-------------|----|-----|----|----|-----|-----|-----|-----|------|-----------|--|--|
| DEMOGRAPHIC DATA                    |       |         |          |        |        |        |                     |           |    | SURVEY DATA |    |     |    |    |     |     |     |     |      |           |  |  |
| A/C Type                            | Age   | Avg Svc | Total FT | RW FT  | FW FT  | CBT FT | Qualifications      | Acc Error | Q1 | Q2          | Q3 | Q4  | Q5 | Q6 | Q7  | Q8  | Q9  | Q10 | Avg  | Survey B4 |  |  |
| UH1H                                | 31    | 10      | 3950     | 3700   | 250    | 0      | PC,FL,UT,IP,SIP,IFE | N         | 1  | 1           | 2  | 3   | 1  | 2  | 3   | 2   | 3   | 2   | 2    | 2         |  |  |
| UH1H                                | 32    | 7       | 1500     | 1500   | 0      | 0      | PC,FL,UT,ASO        | N         | 1  | 1           | 2  | 5   | 1  | 3  | 1   | 1   | 1   | 2   | 1.8  |           |  |  |
| UH1H                                | 31    | 12      | 4200     | 4000   | 200    | 0      | PC,MTP,MTFE         | N         | 1  | 2           | 3  | 3   | 1  | 1  | 1   | 2   | 2   | 2   | 1.8  |           |  |  |
| UH1H                                | 47    | 23      | 1600     | 1600   | 0      | 850    | PC,FL               | N         | 1  | 2           | 1  | 4   | 1  | 2  | 1   | 2   | 3   | 1   | 1.8  |           |  |  |
| UH1H                                | 44    | 15      | 2200     | 2200   | 0      | 900    | PC,FL,UT,ASO        | N         | 1  | 2           | 1  | 4   | 1  | 3  | 1   | 1   | 2   | 1   | 1.7  |           |  |  |
| UH1H                                | 41    | 8       | 1000     | 1000   | 0      | 0      | PC,FL               | N         | 1  | 1           | 1  | 2   | 1  | 1  | 2   | 1   | 1   | 1   | 1.2  |           |  |  |
| TOTAL                               |       |         |          |        |        |        |                     |           | 71 | 75          | 94 | 133 | 74 | 95 | 110 | 102 | 134 | 94  | 2.52 |           |  |  |
| HIGH                                | 50    | 24      | 7800     | 6000   | 2700   | 1500   |                     |           |    |             |    |     |    |    |     |     |     |     |      |           |  |  |
| LOW                                 | 24    | 2       | 320      | 320    | 0      | 0      |                     |           |    |             |    |     |    |    |     |     |     |     |      |           |  |  |
| MEAN                                | 38.74 | 13.46   | 2789     | 2507.9 | 281.08 | 335.33 |                     |           |    |             |    |     |    |    |     |     |     |     |      |           |  |  |

# **APPENDIX I**

## **REFINED AVIATOR SURVEY**

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## REFINED AVIATOR SURVEY COVERSHEET

The following questions are intended to solicit your input regarding certain behaviors exhibited by Army aviation personnel. This information is being gathered as part of a study sponsored by the U.S. Army Safety Center.

Your responses will remain completely anonymous. The data will be used for assessment purposes only. This information will not become a part of your official record, nor will it be used to make any determination about you. You are not required to provide your name, social security number, or any other personal identifying data.

Please carefully complete both sections.

### SECTION A. Demographic Data

### SECTION B. Aviator Survey

[NOTE: There are six separate surveys with 10 identical queries, differing only by the statement at the top of each page. Please read the statement carefully before completing each survey.]

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## AVIATOR SURVEY

### SECTION A. Demographic Data

1. Indicate the total number of years you have been an Army aviator.

\_\_\_\_\_ years

2. Indicate the approximate number of flight hours you have accrued in Army aircraft.

\_\_\_\_\_ total

\_\_\_\_\_ rotary wing

\_\_\_\_\_ fixed wing

\_\_\_\_\_ combat

3. Indicate your age.

\_\_\_\_\_ years

4. Indicate the aircraft in which you have accrued the most flight time during your Army aviation career.

\_\_\_\_\_ mission/type/design/series

5. Check all additional qualifications/ratings you hold or have held:

Pilot in Command

\_\_\_\_\_

Flight Lead

\_\_\_\_\_

Unit Trainer

\_\_\_\_\_

Instructor Pilot

\_\_\_\_\_

Standardization Instructor Pilot

\_\_\_\_\_

Instrument Flight Examiner

\_\_\_\_\_

Aviation Safety Officer

\_\_\_\_\_

Maintenance Test Pilot

\_\_\_\_\_

Maintenance Test Flight Examiner

\_\_\_\_\_

6. Have you ever been involved in an Army Class A-C aviation accident where you were identified by the accident board as having committed an error that contributed to the accident?

Yes [ ]

No [ ]

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## AVIATOR SURVEY

### SECTION B1. SURVEY

Check the appropriate block that corresponds to the number of times (best guess) you have knowingly, and of your own volition, performed the following types of actions during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 4 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 5          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B2. SURVEY

Check the appropriate block that corresponds to the number of times you have felt command pressure or have otherwise been coerced into performing the following types of actions during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 4 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 5          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B3. SURVEY

Check the appropriate block that corresponds to the number of times you have personally observed the following types of actions committed by another aviator during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 5 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 4          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B4. SURVEY

Check the appropriate block that corresponds to the number of times someone has told you about seeing another aviator perform the following types of actions during your Army aviation career.

|     |                                                                                                                                                         | Zero | Less than 3 | 3 to 5 | More than 5 but less than 10 | 10 or more |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|------------------------------|------------|
| 1.  | Flown terrain flight without fully/completely documenting on-board hazard maps                                                                          | 1    | 2           | 3      | 4                            | 5          |
| 2.  | Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded                                     | 1    | 2           | 3      | 4                            | 5          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1    | 2           | 3      | 4                            | 5          |
| 4.  | Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles                                                                | 1    | 2           | 3      | 4                            | 5          |
| 5.  | Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)                                  | 1    | 2           | 3      | 4                            | 5          |
| 6.  | Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction                                         | 1    | 2           | 3      | 4                            | 5          |
| 7.  | Exceeded fuel endurance limitations (-10 Operator's Manual)                                                                                             | 1    | 2           | 3      | 4                            | 5          |
| 8.  | Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                              | 1    | 2           | 3      | 4                            | 5          |
| 9.  | Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible | 1    | 2           | 3      | 4                            | 5          |
| 10. | Flown without completing aircraft preflight checks                                                                                                      | 1    | 2           | 3      | 4                            | 5          |

## AVIATOR SURVEY

### SECTION B5. SURVEY

Check the block that corresponds to the one most appropriate administrative action you believe would discourage the types of behavior (first offense) listed below: [Note: additional training is not appropriate]

|     |                                                                                                                                                         | Verbal counseling by the person witnessing the event | Verbal reprimand by the ASO, SIP, or commander, as appropriate | Revoke PC, UT, IP, etc., orders | Written reprimand by the commander (official file) | Disqualify from aviation service (Flight Evaluation Board) |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|---------------------------------|----------------------------------------------------|------------------------------------------------------------|
| 1.  | Flown terrain flight without fully/completely documenting hazard maps                                                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 2.  | Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 4.  | Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles                                                              | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 5.  | Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)                                | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 6.  | Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction                                                      | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 7.  | Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)                                                                             | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 8.  | Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 9.  | Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 10. | Flying without completing aircraft preflight checks                                                                                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |

## AVIATOR SURVEY

### SECTION B6. SURVEY

Check the block that corresponds to the one most appropriate administrative action you believe would discourage the types of behavior (second or more offenses) listed below:  
[Note: additional training is not appropriate]

|     |                                                                                                                                                         | Verbal counseling by the person witnessing the event | Verbal reprimand by the ASO, SIP, or commander, as appropriate | Revoke PC, UT, IP, etc., orders | Written reprimand by the commander (official file) | Disqualify from aviation service (Flight Evaluation Board) |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|---------------------------------|----------------------------------------------------|------------------------------------------------------------|
| 1.  | Flown terrain flight without fully/completely documenting hazard maps                                                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 2.  | Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 3.  | Exceeded airspeed, power, or RPM limitations                                                                                                            | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 4.  | Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles                                                              | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 5.  | Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)                                | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 6.  | Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction                                                      | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 7.  | Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)                                                                             | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 8.  | Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable                                                   | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 9.  | Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |
| 10. | Flying without completing aircraft preflight checks                                                                                                     | 1                                                    | 2                                                              | 3                               | 4                                                  | 5                                                          |

## **APPENDIX J**

### **REFERENCES**

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## **APPENDIX K**

### **GLOSSARY**

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## GLOSSARY

|           |                                                       |
|-----------|-------------------------------------------------------|
| ACFT      | Aircraft                                              |
| ACT       | Aircrew Coordination Training                         |
| ADAPCP    | Alcohol and Drug Abuse Prevention and Control Program |
| AFAST     | Alternate Flight Aptitude Selection Test              |
| AFQT      | Armed Forces Qualification Test                       |
| AIDS      | Accident/Incident Data System                         |
| AIRAC     | All Industry Research Advisory Council                |
| AR        | Army Regulation                                       |
| ARI       | Army Research Institute                               |
| ASMIS     | Army Safety Management Information System             |
| ASO       | Aviation Safety Officer                               |
| ASVAB     | Armed Services Vocational Aptitude Battery            |
| ATM       | Aircrew Training Manual                               |
| CD-ROM    | Compact Disk-Read Only Memory                         |
| CM        | Crewmember                                            |
| CP        | Copilot                                               |
| CRC       | Crime Records Center                                  |
| CODARS    | Client Oriented Drug and Alcohol Reporting System     |
| CVB       | Central Violations Bureau                             |
| DA        | Department of the Army                                |
| DAMIS     | Drug and Alcohol Management Information System        |
| DOD       | Department of Defense                                 |
| DMDC      | Defense Manpower Data Center                          |
| DUI       | Driving Under the Influence                           |
| EIS       | Enforcement Information System                        |
| ETS       | Expiration, Term of Service                           |
| FAA       | Federal Aviation Administration                       |
| FAST      | Flight Aptitude Selection Test                        |
| FBI       | Federal Bureau of Investigation                       |
| FEB       | Flying Evaluation Board                               |
| HRB       | High Risk Behavior                                    |
| IERW      | Initial Entry Rotary Wing                             |
| IP        | Instructor Pilot                                      |
| IQ        | Intelligence Quotient                                 |
| LTE       | Loss of Tail Rotor Effectiveness                      |
| MOS       | Military Occupational Specialty                       |
| NCIC      | National Crime Information Center                     |
| NDR       | National Driver Register                              |
| NHTSA     | National Highway Traffic Safety Administration        |
| NTSB      | National Transportation Safety Board                  |
| PCC       | Pre-Command Course                                    |
| PDS       | Pilot Deviation System                                |
| PRAM      | Preliminary Report of Aircraft Mishap                 |
| PROC CORR | Correlation Procedure                                 |
| PROC FREQ | Frequency Procedure                                   |
| RFAST     | Revised Flight Aptitude Selection Test                |

|         |                                              |
|---------|----------------------------------------------|
| RPM     | Revolutions Per Minute                       |
| SAS     | Statistical Analysis System                  |
| SM      | Servicemember                                |
| SSAN    | Social Security Account Number               |
| U.S.    | United States                                |
| USACIDC | U.S. Army Criminal Investigation Command     |
| USADAOA | U.S. Army Drug and Alcohol Operations Agency |
| USASC   | U.S. Army Safety Center                      |
| UT      | Unit Trainer                                 |

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