



"HENRI COANDA"  
AIR FORCE ACADEMY  
ROMANIA

AFASES 2011  
"SCIENTIFIC RESEARCH AND EDUCATION IN THE  
AIR FORCE"



"GENERAL M.R. STEFANIK"  
ARMED FORCES ACADEMY  
SLOVAK REPUBLIC



## THE PSYCHOLOGICAL PROFILE OF THE HIGH - PERFORMANCE MILITARY PILOT

Florentina PESCARU, Valentin HALMAGIU

U.M. 01993 Otopeni, U.M. 01945 Fetesti, Romania

**ABSTRACT:** *Becoming a military pilot presents a high appeal for future graduates who want to join the military. In the past few years, due to technological development and increasing requirements, the psychological factor plays a significant role in the complex human – machine (aircraft) environment and flight safety. In this context, the purpose of this paper is to highlight the specific traits of a high-performance military pilot. This was achieved by using the experts' method (Delphi method). Thus, a number of pilots (flight instructors on different types of aircrafts) were asked to enumerate the specific traits of a high-performance military pilot.*

**Key words:** *military pilot, performance, the experts' method.*

### 1. INTRODUCTION

Assessment of professional performance is an important link for an organization, whether civil, military, private or public. This (performance assessment) consists in "... assessing the degree to which human resources fulfill their responsibilities in relation to established objectives. The evaluated person is an individuality who reaches a certain level of competence in a specific situational context" [1, p. 257]

Most often there is relatively low importance given to performance evaluation in different organizations, it turned in a formality to be fulfilled and, moreover, does not reflect the actual performance. In other cases, performance appraisal is given of by the views or preferences (subjective) of the supervisors. In the actual evaluation of performance it is more important to establish clear objectives for the organization, group and individual, and after that the performance criteria and standards can be set [2].

Based on these aspects we intend to approach in this paper the issue of professional performance in military pilots.

The subject is not new. Overtime it was the aim of many studies and researches. In this context, our paper is part of an ample study regarding the relationship dynamics between emotional intelligence and decision-making performance in military pilots, circumscribed to the specificity of this professional category.

At this stage of our analysis we have proposed to establish the performance criteria for the military pilot. For this we used the *Delphi method* (the experts' method) adapted to our needs, given the small number of military flight instructors. In this regard, we asked a representative group of experts (chief pilots / flight instructors) to list a number of traits (in order of importance to them) considered absolutely necessary to a high-performance military pilot. After the qualitative data analysis of the results we have collected a number of primary traits (here the notion of primary trait refers to the relationship between the perception of the subjects and the semantic meaning of different words used by them) that characterizes a military pilot, expressed in the form of assertions or adjectives. Later, these early results have been analyzed from the semantic - qualitative viewpoint.

## 2. ANALYSIS OF PILOT FLYING PERFORMANCE

Performance issues in aviation psychology have been the subject of psychologist Valeriu Ceausu's work (1972, 1978, and 1983). Under his guidance, in the aviation psychology laboratory the foundations were laid for the PSYCOMP system developed in the early '90s [Popa & Popescu, 1994]. Noteworthy is the participation in the space program for the selection and training of the candidates who could become cosmonauts. Within the scientific research program of the first space flight the psychological experiment called "Information" was performed [3].

In his works (1972, 1978 and 1983), Ceausu speaks of the so-called segment of *previous performance - aspiration - subsequent performance* (P1 - A - P2), segment which is the basic unit of human activity. Performance level, from a certain point, contributes to the constitution and determining the level of aspiration. In turn, aspiration influences the performance in the next action [4].

Pilot flying performance was also evaluated using data obtained through Zapan method of interpersonal appreciation at the Air Force Academy [5]. It contained the following evaluation criteria: general theoretical education, specialty training, and performance in flying, sports training, discipline and compliance with the group. In the Psychology Laboratory of the National Institute of Aerospace and Medicine, in 2000-2001, these performance criteria have been placed in relation to decision-making behavior under uncertain situations, using the computerized test Optimum Stop.

Also, in aviation there is often a tendency to associate professional performance (in flight) with psychological performance, meaning results to the psychological tests in the laboratory. In this context, age as mental capacity variable has been recognized and studied extensively in aviation psychology. In analyzing the relationship between age and flight accidents there is the issue of changing mental capacities associated with advancing age. According to the results of an experiment

conducted by Ceausu (1972), the maximum effectiveness of the decision in aeronautical personnel (called "the motor expression" of activity) is reached between 22-30 years and maladaptive manifestations occur in the fourth decade of age, respectively between 33-34 years (especially for the jet fighter pilots, where the motor component is subject to maximum requirements). In a study of Popa (1997), the changes in mental performance depending on the age of aeronautical personnel were studied. Thus, there were a number of considerable changes in information processing capacity in a diminishing direction, starting with the second half of the decade of age between 35-39 years and a significant accentuation over 45 years.

The relationship age - human performance in the aeronautical environment was analyzed in the years 1993-2002 with the computerized psychological test system PSYCOMP [6]. The investigated variables were a number of cognitive features (abstract-logical reasoning, verbal intelligence, mathematical calculus, spatial representation, attention, operation in multitasking mode) and personality traits with the help of the ALAPS questionnaire - Armstrong Laboratory Aviation Personality Survey [Retzlaff, 1996]. Analysis of the results of cognitive tests shows a trend below the average of the sample investigated both in terms of Intelligence Quotient (especially after age 45-49 years) and the basic arithmetic operations level and in the operation with multiple tasks.

In regard to personality, "*progressive trends are seen with growing age on scales like emotional lability, anxiety, preference for alcohol, depression, and declining trends in scales such as trust, risk, sociability*". Also, it can be seen "*with growing age, an increasing tendency of emotional reactivity characteristics (depression, anxiety, emotional instability), of the negative attitude and dogmatism, while diminishing tolerance for risk, sociability and self-confidence*" [7, pp. 51-55].

In terms of identifying the criteria for professional performance, this is one of the five phases of the predictive validity of psychological selection in the aeronautical



environment [8]. The criteria most commonly used are those based on performance in the training process, but there are multiple longitudinal criteria. It can be said here that the identification and measurement of performance criteria in the aeronautical environment presents major difficulties, given by:

- remoteness in time from selection;
- the pilots performance influenced by variables such as *amount of flight hours* (in this context, our view is that the number of flight hours is insufficient to maintain a high level of performance) or *professional experience*;
- "*assessment opposition*" manifested primarily by experienced pilots, which leads to difficult acceptance and effective implementation of performance measurement procedures [9].

### 3. RESEARCH METHODOLOGY

The research objective is to identify performance criteria for the military pilot.

The research group used in the investigation is composed of 30 chief pilots/flight instructors (male) from a military air force base. The group was composed of three groups, of the following types of aircraft: C130 Hercules (10 pilots), AN 26 (10 pilots) and IAR-330 M (10 pilots).

#### Method

In the research were used:

- *Delphi method* - a method for stimulating group creativity (developed by Helmer), "*builds on the views of a group of experts in the proposed theme*" [10, p. 200]. Used to identify *performance criteria* for a military pilot, the method has been adapted by us considering the small number of military flight instructors. The topic was presented using a questionnaire and then completed independently by each

participant / respondent [11]. Thus, from the definition of performance, a group of chief pilots / flight instructors was asked to list a number of features - in order of importance to them - in grades from 1-10 (1 = lowest importance, 10 = highest significance), which they believe that a high-performance pilot must possess.

- *Documents analysis* (job description, job appraisal sheet, regulations / provisions).
- *Structured interview* centered on the theme addressed.

### 4. ANALYSIS AND DATA PROCESSING

After the qualitative processing of the results a total of 30 characteristics / traits emerged that we have classified into five areas / categories as follows:

- **cognitive domain**, which included *above-average intelligence, ability to make quick decisions* (understood as quick problem solving), *capacity for analysis and synthesis, capacity to anticipate*;

- **the specialized training domain** that includes *a good specialist training, continuous improvement, general knowledge* (understood as a necessary foundation in specialized training);

- **the psychological aptitudes domain**; in this category were listed *piloting skills, psycho-physical strength, focused attention, distributive attention, memory, sense of observation*;

- **the personality traits domain** (which includes the long list of traits) respectively *self-control, perseverance, ambition, self confidence / courage, moral conduct, the desire for self improvement, team spirit, risk taking, sociability, communication skill, will, altruism, accountability, diligence, sense of organization, the motivation for the chosen profession*;

- *the psycho-pedagogical skills domain*; in this category characteristic "good educator" was included.

After processing the responses and average calculation for each characteristic individually, the following classification resulted:

Nr. crt.	Specified characteristics	Average
1.	<i>Good specialist training</i>	9,41
2.	<i>Piloting skills</i>	9,38
3.	<i>Motivation for the chosen profession</i>	9,38
4.	<i>Ability to make quick decisions</i>	9,35
5.	<i>Self-control</i>	9,26
6.	<i>Distributive attention</i>	9,20
7.	<i>Accountability</i>	9,05
8.	<i>Continuos self-improvement</i>	8,97
9.	<i>Psycho-physical strength</i>	8,94
10.	<i>Focused attention</i>	8,85
11.	<i>Capacity for analysis and synthesis</i>	8,76
12.	<i>Sense of observation</i>	8,73
13.	<i>Capacity to anticipate</i>	8,67
14.	<i>Team spirit</i>	8,67
15.	<i>Self confidence / courage</i>	8,58
16.	<i>Diligence</i>	8,50
17.	<i>Memory</i>	8,47
18.	<i>Desire for self improvement</i>	8,47
19.	<i>Communication skill</i>	8,26
20.	<i>Will</i>	8,14
21.	<i>Risk taking</i>	8,11
22.	<i>Perseverance</i>	8,08
23.	<i>Above average intelligence</i>	7,97
24.	<i>Ambition</i>	7,97
25.	<i>Good educator</i>	7,85
26.	<i>Moral conduct</i>	7,70
27.	<i>Sense of organization</i>	7,70
28.	<i>Sociability</i>	7,17
29.	<i>Altruisme</i>	7,14
30.	<i>General knowledge</i>	6,91

As it can be seen, the highest mean was obtained for the characteristic "Good specialist training" (i.e. 9.41), while at a small

difference (i.e. 9.38) "piloting skills" and "motivation for the chosen profession" were judged to be important. Thus, we consider that to be a high-performance military pilot are important both expertise gained during his career (e.g. to have a good knowledge of the aircraft he's flying, etc.) and the piloting skills (e.g. to know how to handle the aircraft and to execute the flight maneuvers and air navigation elements, etc.). In respect to "the motivation for the chosen profession", it was described by respondents through desire, love, dedication and passion for flying.

Also, "the ability to make quick decisions" is another important characteristic (denoted 9.35) in high – performance military piloting, described by the ability to judge quickly and make decisions in the shortest time. Referring to this characteristic, it is known that in the flying activity *decision* plays a very important role. This is because the decisions taken during the flight involves a great responsibility and a great amount of dynamic and complex information. Popa (2005) considers that the most important decisions about the flight are *routine decisions* and *creative decisions*. *Routine decisions* are taken by pilots almost all the time (for example, extending the undercarriage, reaching a predetermined height, etc.). In these types of decisions are involved capacity of anticipation and foresight, but the lack of these capacities can block the process of routine decisions, with serious consequences (the destruction of the aircraft or casualties).

In terms of *unique or creative decisions*, these are decisions that the pilot can rarely take or even only once in his career. They can be taken in extreme situations that require urgent action (ejecting at low height in case of engine failure, forced landing due to technical difficulties, etc.). Therefore, in aviation there are special training programs that require pilots to familiarize with new situations and adopt the most effective strategies for solving them [12].

Another important characteristic was "self-control" (denoted by 9.26), described by respondents as emotional balance, control of their emotions in extreme situations. Therefore this characteristic may have a predictive value



of high - performance in pilot flying. An example is provided by the results obtained at Cattell's 16 PF Questionnaire by 62 students included in a study by Bartram (1986). There were differences between those who completed and those who have not completed the flight program at factors C, O, I and N. Thus, those who have successfully completed the flight program were more emotionally stable (C), along with other characteristics such as reduced susceptibility to anxiety and depression (O), an accentuated tendency to be aggressive and competitive (I) [13].

Less important for a high - performance military pilot was the "altruism" characteristic. We appreciate, at a hypothetical level, that the willingness to "act selfless for others" [14], to show generosity, is not an important criteria for a high - performance military pilot. The least important characteristic was considered "general knowledge", which means that to achieve a high level of pilot flying performance in military knowledge / information from other areas are less important.

The psychological profile of the flight instructor (included in our research as an *expert* because of flying experience) aims, along with the four areas of analysis mentioned above, the **psycho-pedagogical domain**. This area relates to the flight instructor's ability to be a *good educator* (characteristic rated at 7.85), in order to transmit to military pilots specialized knowledge, flying technique, the ability to communicate with the pilots they are educating, to motivate and prepare the young pilots to self-teaching and self-education.

In other words, "*the flight instructor must be a good educator who has the knowledge and skills necessary, has to be able to communicate them and shape them in those whom they train and instruct* (s.n.) *has to be a good example of professionalism and ethical conduct to the pilots he trains. He bears full responsibility for the safety of the aircraft and*

*the crew during flight training and evaluation, helping to maintain a level of flight safety"* [15, p. 29]. Of course all of this is an ideal requirement for a good flight instructor.

## 5. CONCLUSIONS

This paper was conducted as a form of illustration of the possibilities the psychologist by his analytical approach, can make them available to those who are interested. Throughout the paper we have sought to include more aspects emphasizing, in a different light, the *performance* in military aviation and the criteria for identifying it in the military pilot.

To explore and this topic, in our future research we will consider the following steps:

- evaluate through adequate tools / tests the necessary characteristics, identified by us, for a high – performance military pilot;
- identification of possible correlations between the performance criteria for a military pilot and components of emotional intelligence, respectively *self-management, self-awareness, motivation, empathy, social skills* according to the model agreed by us of Robert Wood and Harry Tolley [16].

## Bibliography

1. Manolescu, A. și col. (1999). *Managementul resurselor umane*. București: Editura Economică. p. 257.
2. Kubr, M. (1992). *Management consulting. (Manualul consultantului în management)*. București: Editura AMCOR. p. 334.
3. Popa, M. (2005). *Psihologie aeronautică*. București: Editura Universitară Carol Davila, p. 4.
4. Ceaușu, V. (1983). *Autocunoaștere și creație*. București: Editura Militară. , pp. 80-85.

5. Vasilescu, P.I. (2001). Comportament decizional în condiții de incertitudine, vârstă și predicția performanței în activitatea de zbor. *Revista de Medicină și Psihologie Aeronautică*, nr. 4, pp. 39-41.
6. Popa, M. (2002). Vârsta și performanța umană în mediul profesional aeronautic. *Revista de Medicină și Psihologie Aeronautică*, nr. 4, p. 50.
7. Popa, M., op. cit., pp. 51-55.
8. Popa, M. (2005). *Psihologie aeronautică*. București: Editura Universitară Carol Davila. p. 300.
9. Popa, M., op. cit., p. 301.
10. Bogáthy, Z. (2007). *Manual de tehnici și metode în psihologia muncii și organizațională*. Iași: Editura Polirom. p. 200.
11. Hoffman, O., Popescu, G.H. (2009). *Probleme de metodologie în analiza realităților sociale*. București: Editura Universitară. , p. 257.
12. Popa, M., op. cit., pp. 26-27.
13. Popa, M., op. cit., p. 309.
14. \*\*\* (1998). *Dicționarul explicativ al limbii române*. București: Editura Univers Enciclopedic. p. 30.
15. \*\*\* (2006). Dispoziția nr. 13/13.03.2006 privind selecționarea, formarea și activitatea instructorilor de zbor din Forțele Aeriene, M. Ap. N., Statul Major al Forțelor Aeriene. P. 29.
16. Wood, R., Tolley, H. (2003). *Inteligența emoțională prin teste. Cum să vă evaluați și să vă creșteți inteligența emoțională*. București: Editura Meteor Press.