

Guidance material and best practices for pilot aptitude testing

When growing up, a common answer to 'what does one want to be when you grow up' was, of course, becoming a Pilot. To a kid, the profession looked exciting and "plane" cool. At a young age, one believes anything is achievable BUT does one ever consider whether the dream career is really compatible?

Before enrolling at a flight school, it is critical that the potential Pilot undergoes an aptitude screening test to determine if the role is going to be the right fit for the person.

The potential student will benefit from the test as it will prevent money being wasted on unnecessary examinations and training; one does not want to discover during the process that the profession is not what was expected.

The screening test consists of many elements such as the interview with the flight school, physical assessment, personality questionnaires, and most importantly the aptitude test. Aptitude tests might differ between flight schools, but some of the most common tests are:

1. Numerical Reasoning: A pilot needs to be able to read and understand numerical information and make calculations quickly and accurately.
2. Verbal Reasoning: A pilot needs to follow the instructions given to them in a written format and act on them accordingly.
3. Spatial Reasoning and Orientation: Some of the key skills for a pilot are the ability to understand the relationship between forms and space.
4. Abstract and Figural Reasoning: A pilot needs to understand and analyse visual information through pattern recognition, as well as the ability to generate hypotheses, change tracks and critically evaluate.
5. Logical Reasoning: A pilot needs to draw logical conclusions from non-verbal information and apply it to problem-solving.

This not only ensures that the potential pilot is capable of performing the tasks assigned, such as being task manager or executing any technical job aboard the aircraft. The system also guarantees the flight school that the best candidates are coming through, while also remarkably reducing the training costs for the airlines.

Without the aptitude screening, airlines could suffer losses due to unqualified crew. It's essential that the crew assigned to the flight should be able to handle any situation that they have to face, ranging from issues such as landing an aircraft in the middle of nowhere, to having the ability of verbal reasoning if an incident occurs on board and being able to fix a mechanical problem if one should arise.

Investment in flying to become an airline pilot is a very expensive endeavour for those without financial assistance. It is also very competitive and unless you excel in the aptitude test, your dream may be a long way off. Therefore, unless you are selected by an airline that guarantees you a flying job, you have to think very carefully whether it is worth your time and money to pursue this profession privately.

LEGAL PROVISIONS FOR APTITUDE TESTING

ICAO: A medical examination, English language proficiency and the ability to comprehend the training course content are all established ICAO requirements, and ICAO also prescribes guidance regarding human performance.

National Regulators and personality criteria: Regulators worldwide have been far more reluctant to develop standards in regard to personality criteria. There are some general requirements for assuring the psychological aptitude of applicants, but there is a serious lack of guidance material. Furthermore, this lack of guidance material creates a problem for the operators and ATOs, which in their own interest, should strive to assure that their future pilots are equipped with all the knowledge, skills and attitudes necessary to perform the job as required. In this context, modern human factor concepts (i.e., Threat and Error Management), manuals such as the ICAO Human Factors Training Manual and ICAO PANS-TRG) and modern crew training concepts (Evidence-Based Training) highlight the need for flight safety driven human performance interventions.

SOUTH AFRICA: Constitution of the Republic of South Africa, Section 22 (Freedom of trade, occupation and profession) and Section 29 (Education) has been in force since 1996. Pilot Aptitude Testing should not be affected by these sections as its main purpose is to enhance safety.

Discrimination: Inevitably, the selection of suitable candidates during aptitude testing requires separation and sorting of the potential candidates. The criteria and standards must be strictly job relevant and directly related to the required job performance in order to justify the selection and eliminate any form of discrimination. However, some countries have imposed legislation with the potential to affect the collection of biographical data and the questions that may be asked during an interview. In some cases hiring decisions may need to be made in order to maintain certain proportions of ethnic groups or gender. In all cases, special focus must be given to the reliability of the testing procedure. An unreliable testing methodology could lead to a proportionally higher rate of rejected applicants in a certain category, which could be considered unlawful.

EXISTING REGULATIONS

ICAO PANS-TRG Doc 9868 Attachment A to chapter 3 No. 3.4 (Population analysis), referring to MPL only; the following sentence could be used to establish national or global requirements: "Contracting States should define the qualifications, in terms of skills, knowledge and attitudes, required for meeting the entry levels for the course and should ensure that an appropriate corresponding selection method is in place."

SOUTH AFRICA:

Discontinuance of flight training

61.02.7 The Director may permanently discontinue the flight training of any student pilot due to safety concerns.

TRAINING AND PROCEDURES MANUAL

141.02.2 1. Information to be contained in training and procedures manual for flight crew training

(6) Training plan

(b) Pre-entry requirements, including:

(i) minimum age;

- (ii) education requirements;
- (iii) medical requirements; and
- (iv) linguistic requirements.

EXAMPLES OF APTITUDE TESTING AIDS

1. ADAPT suite of selection tools



Resource Group's Symbiotic Performance Solutions division has created the ADAPT suite of selection tools using its combined experience within Human Factors, Sports Psychology and Aviation Training Domains.

From a simple ten minute assessment of a candidate's physical and cognitive ability to a full assessment of personality, skills and potential, ADAPT is accurate in all areas. It is a blended assessment that not only looks at skills, but intelligently assesses the impact of behaviour, culture, personality and technology on the person and the potential role.

The ADAPT process is currently used widely in the aviation industry, through pilots, cabin crew and engineers. It is also successfully implemented within the military, armed police services, education and medical industries, amongst others. This demonstrates the flexibility of the system to be transferred to all areas.

International airlines and pilot training academies use ADAPT to discover and acquire the best personnel. They need to predict the trainability of flight crew, their operational effectiveness and how they will fit into the organisation.

ADAPT delivers selection, testing and the detail an organisation needs to make an informed decision about the people in their organisation.

The ADAPT Team is highly skilled in psychology, training course design and delivery, leadership and management and human factors.

ADAPT offers a graduated approach to selection.

1. **FAST** is a highly effective ten minute online assessment tool that gives an indication of an individual's multi-tasking and learning potential. The assessment analyses physical and cognitive skill providing an overview of a candidate's breadth of skill and learning potential in the form of an instantaneous four page report.
2. **Online ADAPT** is a blended solution that takes elements of the full ADAPT process and combines them with FAST to create a quick, effective and easy to administer screening tool. It includes a wide range of aptitude, knowledge and personality based assessments or tests that can be combined to create unique assessment packages bespoke to the requirements of each client.
3. **Full ADAPT** is the original, most detailed and statistically proven selection process. It is a comprehensive assessment of a candidate over four hours; examining physical, cognitive, personality, behaviour and the effects of environment and situation. Candidate's performances are assessed against the specific role, operational level and organisation/national culture within which they will be working, to provide a more complete picture of their potential to transition successfully into the role.

2. **COMPASS pilot selection and screening test**

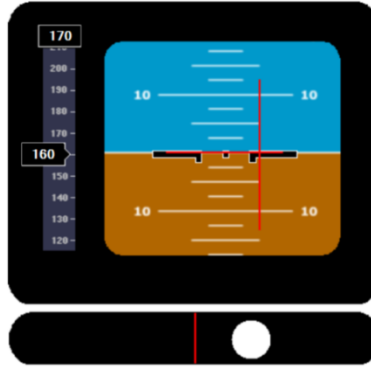
COMPASS: COMputerized Pilot Aptitude Screening System. Selecting pilots or rather screening pilot candidates which have the appropriate set of skills to become an commercial aviation pilot is a difficult and time consuming. FTO's or Airlines often have to free-up time of experienced pilots and instructors to assess candidates suitable as commercial aviation pilots. COMPASS is a pilot selection and screening system used by airlines and FTO's to screen and select candidate pilots for commercial aviation pilot training. Because COMPASS is a series of tests taken on a normal PC, the results are not open to interpretation, all candidates are tested on the same set of skills required to become an airline pilot. The results of the COMPASS pilot aptitude test clearly show in which skills the pilot candidate is proficient or not.

*COMPASS: More than **21.000 pilots** screened using COMPASS. Airlines and FTO's around the world rely on COMPASS for pilot selection.*

COMPASS at a glance:

- COMPASS install on a normal windows PC
- COMPASS tests all skills required to become a civil aviation pilot
- COMPASS is available in: English, Mandarin Chinese

*COMPASS is a pay-per-use system; Pay per COMPASS test taken, **No initial cost, no fixed fees.***



Complex control task (CCT) – COMPASS pilot selection

The COMPASS installation include:

- COMPASS – Aptitude Selection and screening for ab intio pilots
- Advanced COMPASS – Aptitude test for experienced pilots
- CPP – Checklist Professional Profile – Psychometric test for pilot recruitment

Standardised and objective pilot selection and screening:

Because COMPASS is a computer based pilot screening and selection system, there is no human intervention in the tests or results. All pilot candidates are screened using the same baseline allowing the test results of different pilot candidates to be compared.

COMPASS test results show a score for each tested skill.



Eye hand foot coordination test – COMPASS pilot Selection

A typical COMPASS pilot screening test takes between 90 minutes and 2 hours. COMPASS test pilots on the following skills that are needed to qualify as a aviation pilot:

COMPASS: (for Beginner or Ab intio pilot screening)

- Eye-hand-foot co-ordination (Control)
- Eye-hand co-ordination (Slalom)
- Short term memory (Memory)
- Mental arithmetic (Mathematics)
- Spatial Orientation (Orientation)
- Multi-Tasking (Task Manager)

Advanced COMPASS (for experienced aviation pilots)

- Complex Control Task (CCT)
- ATPL Theoretical questions (ATPL)
- Short term memory (Memory)
- Mental arithmetic (Mathematics)
- Spatial Orientation (Orientation)
- Multi-Tasking (Task Manager)

Results of a compass test are instantly checked over the internet by the main COMPASS servers. The results are instantly available and show a score for each tested skill. The presentation of COMPASS test results makes it possible to show a candidate pilot on which skills he or she has scored proficient and which skills need work in order to start aviation pilot training.

WAY FORWARD

The existing process of recruitment and testing at Flight Schools and Operators should be reviewed. The main cost drivers can be identified and should then be organised (where possible) in such a way that the associated costs are minimised.

When building the hiring process, outsourcing of certain modules should be considered. A number of expert service providers supply professional pilot aptitude testing solutions offer at globally competitive prices. Some of these providers use internet to administer tests and therefore are location-independent and cost effective.

A professionally administered Pilot Aptitude Testing (PAT) program may be viewed as a significant cost at first, but in relation to the far greater potential cost of a failed selection process, it must be seen as the first critical step in developing a piloting career. As such it can be seen as the cement poured into the foundations of an effective operator Safety Management System.

The South African Civil Aviation Authority is committed to helping potential pilots find their wings. It is recommended that ATO's implement a suitable Assessment tool that can be used to provide a cost effective method of selecting and screening candidates that have the appropriate set of skills to become a successful Commercial Pilot! (*This can be done as a recommendation to Flight Schools and Operators or enforceable by Regulation amendment*).

ATO's and Operators are invited to give feedback to PEL.Training@caa.co.za regarding their experiences, concerns or suggestions.

ATTACHMENTS

- A IATA, "Guidance Material and Best Practices for Pilot Aptitude Testing". 2nd Edition
- B Example of an 'ADAPT' assessment