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PABT and CPSS

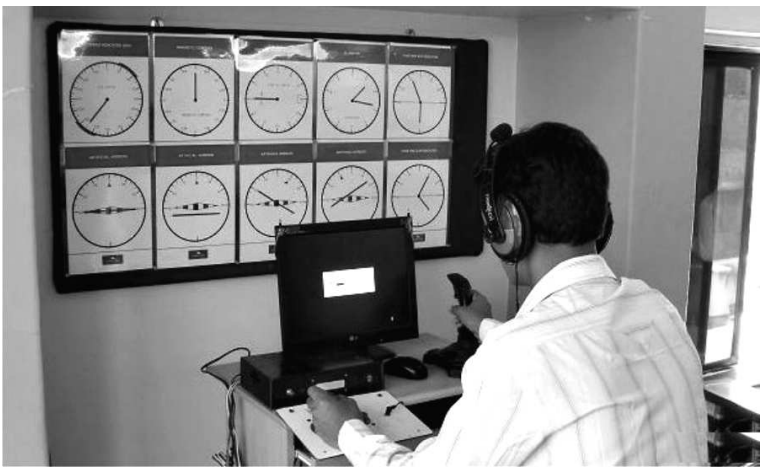
Pilot Aptitude Battery Test (PABT)

Pilot Aptitude Battery Test (PABT) is an aptitude test designed and conducted for all those candidates who aspire and apply for a flying career in the Air Force. The main aim is to assess a candidate's aptitude to be trained as a pilot and test the mental alertness, judgement power, presence of mind and self-confidence of the candidate. It checks whether a prospective candidate has proper control over his nerves while he is flying an aircraft. The test is conducted by any one of the Air Force Selection Boards.

Earlier PABT was not conducted for the procedure of recruitment to the army. But due to frequently occuring crashes made the realisation that military pilot should have the presence of mind and should be capable of withstanding mental and physical strains at the odd time. Thus, PABT emerged.

Following points should be kept in mind while at PABT Test :

- How attentively you listen to a session and how you answer the simple questions that follow?
- What amount of focus you have in attempting questions correctly while keeping the wrong ones as low as possible?
- Do you have a keen interest in knowing about an aircraft?



Need for Conducting PABT

It was discovered during the Second World War that the selected pilots of the Air Force always did not possess the aptitude for a flying job. As a result often aircrafts crashed and met with accidents. This frequent mishappenings led to the introduction of a strategic and scientific PABT test. This PABT test is governed by the natural ability and qualities of the candidate, no special coaching is required to clear this test.

Way of Conducting PABT

The test is carried out in two phases namely :

1. Written Test or Instrument Battery Test
2. Machine Test

1. Written Test or Instrument Battery Test

The written test is conducted to determine whether the candidate has the ability to monitor a number of instruments at one time and quickly interpret and extract the required information.

It consists of two parts :

I. Apparatus Reading Test II. Plane Position Test

I. Apparatus Reading Test

The aim of this test is to find the ability of the candidate to read different instruments in short span of time. The images of different instruments with different readings are given. **60 questions are given to attempted in only 20 minutes**. About six measuring instruments of an aeroplane are shown and explained to the candidates. Following are the measuring instruments :

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(i) **Magnetic Compass** : This instrument is used to determine the direction in which the aircraft is travelling towards. It consists of a sharp needle which always points out to the North. The compass has 8 directions i.e. North, South, East, West, North-East, North-West, South-East and South-West. There are 90 degrees between each direction starting at magnetic North or zero degrees. It is important to understand that the magnetic compass is accurate only while the aircraft is flying wings-level in steady state, non-accelerated flight.

(ii) **Altimeter** : This instrument indicates the Altitude or the height of the aircraft above the ground. It has markings from 0 to 9 calibrated in feet. There are three needles in this. The smaller one indicates the height in 10000 of feet, middle needle indicates the height in 1000 of feet and the larger one indicates the height in 100 of feet. All these needles move in clock wise direction. The accuracy of the altimeter in the plane is very important for its safe flying.

(iii) **Artificial Horizon or Altitude Indicator** : The artificial horizon or the altitude indicator shows the aircraft's relation to the horizon. From this the pilot can tell if the aircraft is climbing, descending, turning or straight and level. It gives a direct indication of changes to pitch attitude. It is measured from 0 to 90 degree left and 0 to 90 degree to the right, the instrument is meant to depict the sky (usually blue in colour) and the ground (typically brown), with a miniature airplane positioned on the artificial horizon (a white line) in level flight.

(iv) **Air speed indicator** : This instrument provides the speed of the air which is a vital parameter for flying operation. The speed is measured in miles per hour or kilometres per hour or in knots. It has a dial and a needle. The needle moves clockwise as the speed increases and it indicates the speed of the aircraft. Airspeed indicators are colour coded so the pilot can easily identify ranges such as the normal operating range, flap oerating range and caution range. Minimum and maximum speeds, as well as other important speeds are marked as well.

(v) **Climb and Descent indicator (Vertical Speedometer)** : It depicts the rate of the aircraft's climb or descent. In level flight, the indicator needle points to 'O' feet. When the needle goes up, it means that the aircraft is climbing. Similarly, if the needle goes down, it implies that the aircraft is diving.

(vi) **Turn or Back indicator** : From turn or back indicator, the Pilot can find out whether the aircraft is turning left or right. If the plane is turning left, the black ball remain in the centre and the white needle will move to the left. It means the white needle will invariably move to the direction opposite to which the aircraft is turning.

II. Plane Position Test

In this test, the candidates are explained about the various positions in which the plane travels and the regions of the plane that are visible from the front when it is travelling in these positions.

Rules to find directions :

(i) If you see the nose of the plane, the plane is coming towards you then it is moving towards south.

(ii) If you see the black dot of the plane, the plane is going away from you and it is moving towards north.

(iii) If you see the plane moving in such a way that the nose is to your right and tail to your left, then it is moving towards east.

(iv) If you see the plane moving in such a way that the nose is to your left and tail to your right, then it is moving towards West.

Ascent/Descent identification for East-West movement :

(v) If the nose is at a lower horizontal level than the tail, than the plane is surely losing height or descending.

(vi) If the nose is at a higher horizontal level than the tail, than the plane is surely gaining height or ascending.

Ascent/Descent identification for North movement : (When you see the black dot or the tail)

(vii) It you see the belly of the plane, then the plane is losing height.

(viii) If you see the top portion of the plane then the plane is gaining height.

Ascent/Descent identification for South movement : (when you see the nose) :

(ix) If you see the belly of the plane, than the plane is gaining height.

(x) If you see the top of the plane, than it is losing height.

Note Only those who qualify the Written Test are eligible to give the Machine Test.

2. Machine Test

This test aims at judging the reflexive capabilities of a candidate in response to the external stimuli. In this test, the locomotive and sensory abilities of the candidates are put to examination; both the tests are conducted to note down the eye-ear-hand-feet coordination of the candidate.

Thus, candidate can score well, can grasp the maximum in the shortest time and also apply the same within the short time duration. In each test, **the candidate is given three chances to come up with good scores**. The best score is counted of all the three. Each turn is of 90 seconds in test 1 and 60 seconds in test 2.

It comprised of two test as given below :

1. Light Control Test

In this test, the candidate is made to sit infront of a CRT monitor. The cathode ray tube is a vacuum tube containing one or more electron guns and a fluorescent screen used to view images. In this test, a spot of light (ball) is to be maintained in the centre of two cocentric squares.

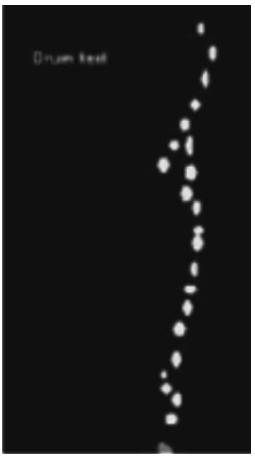
The spot of light, if left, moves across randomly all over the screen. Also, there are two lights, yellow and red which come up in the top left and top right corners of the screen intermittently. The candidate is asked to fly along the chartered path keeping the light which represents the aircraft on the monitor, on the chartered path.

The devices needed to control the spot are as follows :

- **Hand Operated Stick** This stick controls the movement of the stick in up and down direction. It is of the shape of the gear-changer in cars.
- **Foot Pedals** The operation of the pedals moves the spot of light (ball) to right or left.
- **Light Lever** A hand lever is provided which when moved forward puts off red light and when backward puts off yellow light.
- **Beep Button** A button on the top of the stick is used for putting off the beep sound in the head–phones.

Hence, the candidate has to keep the spot of light in the centre of the square and the red/white lights off. The spot of light and the distraction lights are electrically operated by the testing officer. The errors of jugement/delays are recorded automatically. A total of three chances are given to a candidate counting his best score for judgement of his aptitude.

2. Control Velocity Test or Drum Test



In this test, control/motor skills of the candidate are tested. A spot of light (red) is to be superimposed on a series of yellow lights running on the screen from top to bottom. Whenever, there is a successful superimposing, there is a small beep in the head phone. The more times you succeed in superimposing the red ball on the yellow balls, the more points you get. A candidate will get three chances of length of 60 seconds each in this test.

In this test, candidates are required to maintain flight under normal and also in turbulent weather conditions like when the velocity of the wind disturbs the flight trajectory and even if the wind causes the flight to lose height suddenly. Thus, these tests are conducted to know the aptitude of the candidates in controlling the flight at different weather conditions.

Computerised Pilot Selection System (CPSS)

Computerized Pilot Selection System (CPSS) test is now in full effect and has replaced the well-known PABT test to select the best candidates for Indian Air Force flying branch that was in use for decades. The new system will be used to screen pilots for all flying branches of IAF, Army, Navy and the Coast Guard.

CPSS is an intelligent tool for pilot aptitude testing in consonance with the advanced IAF Aircrafts like Su-30, Tejas etc. An integrated new age Computerised Pilot Selection System (CPSS) has been developed by Defence Institute of Psychological Research (DIPR), Delhi and Aeronautical Development Establishment (ADE), Bengaluru, in coordination with the Indian Air Force.

CPSS test is the brainchild of APJ Abdul Kalam, he advised for CPSS when he was scientific adviser of the Prime Minister in 1997. Mr. Kalam suggested to develop an intelligent tool for pilot aptitude test in consonance with the advanced IAF aircrafts. It also aims at addressing the alarming rate of flying accidents attributed to pilot error in IAF, CPSS was intended to address the IAF's long-standing demand for a scientific selection system on par with advanced nations, which can screen pilot aspirants to meet the demands of the latest aircraft. DIPR has developed the Application Software for Cognitive and Psychomotor Tests while ADE has developed the Customised Hardware for the System.

Need of CPSS

The existing pilot selection system i.e. PABT focuses on the few aspects of psychomotor skills of the future pilot, which emphasizes on the eye-hand-leg coordination that was adequate for the old generation aircraft. With the addition and advancement of avionics and weapon delivery systems, handling emergencies and combat operations make severe demands on the pilots.

Thus, it became important to look for a new paradigm in pilot selection system to select future generation combat pilots by evaluating the candidates' psychomotor skills along with cognitive information processing skills. CPSS places special emphasis on psychomotor skills and cognitive abilities of aspirants. It ensures objectivity in results.

Only one Chance in CPSS Test

Like the PABT test, candidate will get only one chance to clear the CPSS test. Once failed, the test can not be taken again and the candidate can never be eligible for flying in the armed forces (Air force, army, navy or coast gaurd). Aspirants will get only one chance to take the test under the CPSS.

The test software with psychomotor and cognitive tests comprehensively evaluates the qualities required for the military pilots such as psychomotor skills, information processing skills (speed and accuracy), coordination, visualisation, time-sharing, etc by subjecting the candidates to perform concurrent multiple tasks.

Phases of CPSS

Computerised Pilot Selection System (CPSS) has two phases :

PHASE 1 The first phase will be a MCQ test. The candidate will be given instructions to read 6 kind of dials present in an aircraft. On the basis of that there will be a number of MCQ tests which include dial reading questions along with IQ, pattern matching, basic maths, tests (around 15 small quizzes in total). It is fairly simple test and anyone with basic school level physics knowledge will clear it.

PHASE 2 After the 1st test the candidate will be made to sit in a CPSS machine which is like a cockpit with a joystick, pedals and a lever (like in an aircraft) with a screen in front of the candidate. He will be made to play a number of games similar to a video game with joystick and have to get a certain score in all games combined to clear this test. Anyone who drives or has played videogames can clear this one easily. The candidate just need hand-leg coordination. Only 3 chances are given in each game and the best score is taken out of the 3, so if a candiadate is not able to do well in the 1st attempt, he can make up for it in the other 2 attempts.

The CPSS test is simple. Elaborate instructions are given before commencement of both these tests so there will be no confusion. Candidate should focus more on SSB part as that is the main challenge.