MHA Advisory on Police Service K9s (PSKs) No. 5

Appendix 'A'

WORKING K9 BEHAVIOUR ASSESSMENT TEST (K9 BAT)

Aim

1. The aim of this Standard Operating Procedure (SOP) on behaviour assessment of potential Police Service K9s (PSKs) i.e. Dogs among Central Armed Police Forces (CAPFs) is as under :

(a) To formulate a Working K9 Behaviour Assessment Test (K9 BAT) for evaluation of green dogs (young adults of 09 to 12 months of age) of different breeds among PSKs at CAPFs Dog Training and Breeding Centres (DTBCs) to ascertain their future capacity as potential/proficient PSKs.

(b) The additional aim of the SOP is to use this K9 BAT to select suitable green dogs from different sources of procurement within India and abroad including those procured from dog breeders among civil society.

(c) The test outcome would assist in evaluating the green dogs (either bred in own kennels or procured from civil sources) to identify the purpose for which they would be most suited. Various dimensions recommended in this test are suitable for detection task, patrol task or dual-purpose (detection and patrol both).

(d) The test would also serve as a useful tool in selecting breeding dogs (candidates) to produce a specialised requirement for different types of PSKs by Estimating Breeding Values (EBV) to ensure heritability of desired traits.

(e) To bring uniformity and standardization in selection of pups/young adults for specialized training in police/security and law enforcement duties.

PART-I: CONCEPT, REVIEW AND CHALLENGES

Individual Behaviour or Personality of Dogs

2. Dogs are highly capable of adapting to new environments and learning to display different behaviours only in certain situations. However, research in this direction has proven that some aspects of a dog's behaviour have limited plasticity. While the dogs are quite consistent in a range of situations however their strategy varies in different contexts and over longer periods. A dog's typical tendency to get excited, fearful or to be aggressive are some common characteristics. Such stable dispositions create what could be called the behavioural style of a dog, which has also been referred to as **temperament, individuality, coping style, behavioural syndromes** and, more lately, as **animal personality**.

Traits as Complexes of Behaviour

3. Central for the issue of individual differences in behaviour, which is also referred to as personality in popular terms, is a *trait.* If the behaviour of a dog is observed, we shall probably find that some behaviours often come together. For example, the dog that snarls when meeting other dogs will probably also raise its tail, lower the head, stare towards the other dog, bare its teeth, and perhaps also lunge towards the dog. Such a 'package' of behavioural reactions may be labelled a '**behavioural trait'** with which it is possible to describe the behaviour of an individual, as well as differences in behaviour between individuals. In everyday terms, we probably would like to call this trait, hostility or aggressiveness.

From Behaviour Traits to Personalities

4. The study of personality in humans is closely related to the assessment of feelings, thoughts and beliefs. Within the study of animal behaviour, internal processes - such as feelings and thoughts - have been considered unobservable or even scientifically irrelevant. As a result of this, it seems that scientists interested in individual differences in animal (dog) behaviour also have avoided the concept of personality because of fear of anthropomorphism. However, besides feelings and thoughts, personality in humans also includes an issue that is possible to study in animals - behaviour. Personality traits can be described as dispositional factors that regularly and persistently determine behaviour in many different types of situations. Thus, an individual's personality can be inferred from the individual's behaviour. This makes the study of animal personality no different from any other study of animal behaviour.

5. Personality assessments in animals should primarily be based on behavioural observations, and not on assumptions of thoughts and feelings. So, behavioural observations may be useful when we want to know something about the dog's personality. But it is also a fact that all behavioural reactions are not expressions of the individual's personality and behavioural trait is not the same as a personality trait. **Therefore, 'dispositional factors that regularly and persistently determine behaviour in many different types of situations' are personality traits.** In this definition, two aspects of stability are included - *stability over time and stability across situations*. **Thus, a behaviour that is easily changed by training should not be seen as an expression of the dog's personality**. Change in behaviour from one time to another may also be due to maturation, therefore, it is important to take maturation into account when assessing a dog's personality - behavioural strategies are a part of the personality first *when it is to at least some degree temporarily stable*.

6. The second criterion from the definition of personality was stability across situations. A single observation of a dog may prove to be highly situation-specific, and may not be relevant at all in other situations. **In the definition of personality, some degree of generality is inherent, which also tells something about one fundamental issue in the concept of personality - making predictions of the individual's behaviour from one situation to another similar situation**.

7. Thus, a glimpse of a dog's behaviour may say something about its personality if the reaction is stable in two regards - **stable over time and across similar situations**. **Personality in a dog should always be seen as an interaction between the dog and the environment and assessed in a context - 'if this happens, or in this type of situation, the dog usually behaves in this way**'.

8. These animals are also more prone to create habits, and, thus, less flexible when circumstances change in a familiar situation. A safer stand-point is to assume that individuals differ in personality according to dimensions from low to high (or low intensity to high, seldom to often, hard to elicit to easily elicited etc.) regarding the behavioural reactions that the trait refers to. *It means that personality descriptions often are relative rather than exact: 'dog A is typically more fearful than dog B'*.

Need to Study Personality in Dogs

9. There has been an increased interest in the study of animal personality, as well as in 'personality of dogs' in the last two decades. It seems that this change is driven by a parallel increase in interest in other areas, one of them being animal welfare. People are keen to assist their pet dog to cope up with various stressful situations because every dog has a different level of reaction to a particular real-life situation. An assessment of the dog's typical behaviour in certain situations when it is abandoned or in the dog shelter, may facilitate its smooth adoption by suitable new owners.

10. the **Second issue is the prediction of behaviour**. Knowledge of future ways of acting in different situations is valuable in the selection of potential working dogs, such as police and military working dogs, guide dogs, dogs that are used for search tasks (explosives, drugs, etc.), guard dogs, hunting dogs and herding dogs. Behavioural signs in a dog that predict success or failure before the dog is trained, or in the early phases of the training period, bring great advantages. Time and money can be saved, and the welfare of dogs and trainers may be improved. Behavioural problems may be avoided, by correctly employing them for the right kind of work, for example, dogs displaying aggressive traits at an early stage can be best avoided in the detection and better employed for patrol work.

11. **A third issue is evolution or, in the case of the dog, domestication.** What traits are favoured during selection, and why? In dog breeding, there is – consciously and unconsciously - a selection for wanted traits and reluctance towards unwanted traits. If we assume that these traits have a genetic base, the type of selection that dominates will decide the typical behaviour of the dogs in future generations. Thus, methods that are useful in assessing the personality in breeding dogs, as well as the offspring, are of great interest for successful directed selection. For example, **standardized behavioural tests have been used as tools in breeding programmes, in breed clubs and selection of working dogs like sports or police and military working dogs**. Besides, it is relevant to understand how other, more unconscious, selection criteria influence the ongoing domestication of dogs. Dog personalities differ in their adaptiveness in different life situations and contexts. A certain dog personality might be highly adaptive in one setting, whereas the same dog might give another owner problem in everyday life due to its typical behaviour. The breeds, where **breeding dogs have a high number of merits from working dog trials are in general more playful than the breeds with parents less often used as working dogs. Furthermore, 'show breeds' are shyer than breeds where show merits seem to be less important over the work purpose**.

How Early Can We Assess Personality Traits in Dogs

12. Even though there are relatively few studies in this area, however, most of them have found that the predictive power of puppy testing is low. The exception may be fearfulness, which is perhaps one trait which may be predicted at an early age. **At what stage it is possible to predict other traits is difficult to assess based on the knowledge so far, however, as the dog grows in age, with maturation, it is more likely for the behaviour assessment to predict its adult personality**. **Most Working Dog Breeding programmes (Police, Military and Guide) rely on a behavioural assessment of young adult dogs between 09 to 18 months of age for better predictive validity and its application to select dogs for specialized training**.

13. In this field, one of the early and elaborative studies was conducted by 'Swedish Dog Training Centre (SDTC) for Armed Forces and Police' during the last decade of the previous century. The behaviour test results of 1310 German Shepherd Dogs and 797 Labrador Retrievers, between the age of 15-22 months of age, were evaluated. It was investigated whether the behaviour tests i.e. Dog Mentality Test (DMA), used at the SDTC, *could be used to select dogs for different kinds of work*

and breeding. Ten behavioural characteristics were scored based on the dogs' reactions in seven different test situations. All tests were conducted by one experienced person. Marked differences in mental characteristics were found between breeds and sexes, but particularly between various categories of service dogs. Regardless of differences in the behaviour profiles of these service categories, there were marked similarities between different categories of service dogs compared with dogs found to be unsuitable for training as service dogs. To interpret the data, an index value was created, based on the test results for each dog, and was found to be an excellent instrument for selecting dogs for different types of work. For both breeds (German Shepherds as well as Labrador Retrievers), the factor analysis resulted in four factors. In comparing the different characteristics, the same pattern was found in both breeds, except for the characteristic prey drive, which seems to be irrelevant for Labrador Retrievers. The conclusion was that a subjective evaluation of complex behaviour parameters can be used as a tool for selecting dogs suitable for specific kind of service dogs. Results also showed that the use and correct interpretation of behaviour tests can be utilized to further adjudge each dog and accordingly plan the service category for which it can be optimally trained or employed.

14. In the same study, regardless of whether the pups were bred & raised internally or purchased, they were subsequently tested for their suitability as a service dog (military & police). They included dogs in the age range of 15-22 months only in this study because earlier studies have shown that test age influences the test results more than previously assumed. In first of its kind study over a prolonged period between 1983-91, all dogs that did not fulfil the demands of a service dog were disqualified and were sold as companion animals in civil society or donated to the puppy walkers who had previously cared for them. Further, about 50% of the dogs selected for training were disqualified during the training period because of one or the other training issues/injury. After completion of the training program, all dogs were finally run through a battery of working tests performed by the buyer organization of the dogs.

Time When Personality is Fully Developed

15. A common but probably misleading view is that personality develops from birth to a certain age, and then remains stable. In human personality studies, it seems that stability of personality is rather low in childhood, increases in adulthood and reaches a plateau between the ages of 50 and 70 years. Unfortunately, there are no studies that give us precise knowledge regarding this issue in dogs. There are also indications on stability over longer periods for few traits studied like sociability towards humans, non-social fear, playfulness towards humans and aggressiveness in adult dogs, however, it is yet not being established how they change in magnitude over the life span if they change predictably. Further, it has been established that there are differences between age categories for these traits. The same trends were found for both sexes, which indicates that non-social fearfulness, sociability and aggressiveness decreases slightly over the years.

The Factors which Moderate Continuity and Change

16. The common way of thinking is probably that environment causes a change in behaviour during development, whereas the genetic bases of behaviour make behaviour stable. Regarding environmental factors that influence behavioural change, it is likely that a range of factors may contribute to the variation of the dog's personality. However, genetic factors may limit the possibilities and set boundaries for the development of behaviour. The degree of heritability of behaviour may give us an indication about how strongly the behaviour is influenced by the genetic factors. In a few cases, behavioural traits seem to be strongly influenced by genetic factors. Heritability estimates between 0.2-0.3 are often acknowledged as relevant and rather high.

Heritability of Behaviour Traits

17. Heritability calculated for characteristics evaluated in behavioural assessment tests can be used as a tool to select different kinds of service dogs. As per the study conducted at SDTC, based on the test results of 1310 German Shepherds and 797 Labrador Retrievers, the heritability for all evaluated characteristics of the two breeds was significantly different from zero except for the characteristic prey drive in Labrador Retrievers. The test results for each characteristic were summarized to form an index value which simplified the interpretation of the test results. The heritability for this index value was 0.24 for both German shepherds and Labrador Retrievers, a value that must be considered high as it included all tested parameters. The heritability was also calculated for the four factors derived from a factor analysis of the test results. Heritability estimates for these four factors were between 0.15 to 0.32. **The results show that complex behavioural patterns in dogs can be subjectively evaluated by an experienced person and that no more than a few characteristics are needed to describe the differences between dogs**. Breeding results in a German Shepherd population at the SDTC improved within a relatively short time after the initiation of the selection of breeding animals based on the index value of each animal. **It was observed that German Shepherds bred by the SDTC also had higher index values than privately bred dogs which shows the importance of a goal-oriented breeding programme with an emphasis on service dog characteristics**.

18. Heritabilities were estimated from the intra-class correlation between siblings within groups of full and half-siblings and are based on the combined components of sire and dam variance. It was remarkable to note that the heritability for the calculated index value and the four factors from the factor analysis was comparatively high. This is generally expected to hold correct for single well-defined characteristics. **The SDTC study, however, showed a higher heritability for complex behaviour systems. The more complex parameters, index values and the four factors from the factor analysis showed a higher heritability than most of the single characteristics that they are based on. One possible explanation considered was that the evaluated characteristics overlap and a higher degree of confidence can be achieved if the information from the evaluated characteristics is pooled**. The probability of this explanation was further enhanced by the relatively high positive phenotypic correlation maintained between the characteristics as ascertained by them in another study conducted during the same period between 1983-91. Another independent study undertaken during the year 1982, showed a heritability as high as 0.44 to predict a dog's ability to become a guide dog for the blind. The characteristic used was defined as "success" for the end objective in the guide dog training. Yet another study calculated the heritability of "temperament" to be 0.51 in 575 military dogs conducted during 1985 on heritability estimate for temperament scores in German Shepherd Dogs and its genetic correlation with hip dysplasia. **In both cases, the high heritability figures were calculated on a characteristic that summarizes complex behaviour systems.** With regards to this, it should be pointed out that the characteristic "temperament" in the study conducted during the year 1985 was defined as a military dog's suitability for protection and tracking and was different from the definition of temperament used in the study undertaken by SDTC during the period from 1983-91 in Sweden.

PART-II

WORKING K9 BEHAVIOUR ASSESSMENT TEST (K9 BAT) AND IT'S PREDICTIVE VALIDITY

General

19. Consistent behavioural variation within and between individuals is ubiquitous in all working dog populations as explained in Part-I. Most of the working dog programmes have recognized this fact world over and have subsequently attempted to quantify behaviour through the use of standardized tests. Standardized tests may employ several measurement methods, but two common ones are **Behavioural Ratings** (BRs) and **Subjective Ratings** (SRs). The former is characterized by a rating for behaviour (e.g., reaction to a noise) usually based on a single observation or test whereas, the latter is characterized by a rating for a trait (e.g., confidence) that is based across multiple observations of behaviour. The main difference between the two rating methods is the level of aggregation or intuition, that is required by the human observer or assessor.

20. Measurement theory predicts that ratings based on multiple observations (i.e., subjective ratings) should be more reliable because measurement error is reduced. However, subjective ratings, by definition, may be susceptible to observer bias, in which ratings based on fewer, but better-defined observations (i.e., behavioural ratings) could result in greater reliability. **In either case, the ultimate criterion of most working dog programmes is the predictive validity of measured behaviours in standardized tests**. In this connection, **the relative predictive validity of subjective and behavioural ratings is always a good idea for any organization within the same working dog population**.

21. The diverse models of working K9 behaviour assessments prevailing world over were reviewed from all the dimensions to formulate the one for various CAPFs in our country. The advantages of vast experiences of Swedish Armed Forces Breeding Kennels were useful in this direction, which not only have one of the most successful working K9 breeding programmes but have also evolved scientifically over some time with diligent research & practice. Analysis of behavioural test results along with training outcomes in the test for working K9s can be measured using 25 BRs and 13 SRs. It was established through data reduction and confirmatory techniques that 25 of the BRs can be reduced to 5 underlying behavioural dimensions and that all 13 SRs can be reduced to 3 dimensions. These five underlying dimensions in BR were confidence, physical engagement, social engagement, aggression, and environmental sureness and the three in SR were engagement, confidence, and aggression consisting of originally proposed 25 BRs and 13 SRs, respectively. Both the rating methods correctly classified a high percentage of dogs that did/did not complete training (70.3–78.3%) as per research experience. However, only minor differences in predictive validity were observed between the two measurement methods (1.7–6.6%). Engagement and confidence, irrespective of the measurement method, were the strongest predictors of training completion, but the two rating methods identified different aspects of engagement and confidence that may be important to training outcomes in varied working dog programmes. **There is a need to use both subjective as well as behavioural ratings from the standpoint of prediction against training goals/outcome and also for use of these scores in estimating breeding values (EBVs) in the process of making vital decisions for the sound breeding programme.** Empirical verification is always a good idea for any working dog breeding programme to validate these tests, along with improvements in the explicit definition and measurement of 'success' over some time.

The PSK Candidates for Assessment

22. Most of the CAPFs have established their Dog Training and Breeding Centres (DTBCs) to meet their unique requirement of PSKs. There are few which have been granted the mandate of breeding PSKs to meet not only their requirement but also to meet requirements of other CAPFs and Central/State Police and other Law Enforcement Agencies. SSB, BSF and ITBP have been granted breeding mandate to produce and supply with high-quality patrol, detection and tracker K9s of different breeds while CRPF has been accorded limited breeding mandate to produce Belgian Shepherd Malinois (BSM) breed of dogs. These breeding programmes are envisaged to quickly adapt to produce detection and patrol dogs to meet the unique requirement of 'Dual-Purpose K9s' (DP K9s) which can perform both the tasks of Patrol and Detection. The breeding stock currently held by these DTBCs has been procured from various sources including some being recruited exclusively from puppies produced within their programme itself.

23. At birth, puppies are group-housed with their litter and mother until weaning at 8 weeks of age, when they are further reared within the group at their kennels. The DTBC instructors monitor their rearing under supervision providing necessary direction and assistance to their handlers. The puppies have been imparted housebreaking, environmental exposure and socializing training up to six months of age while basic obedience or tactical obedience training is being imparted between six to nine months of age. While these boundaries are generally blurred to suit the organizational requirements and development displayed by the puppy, however, between the age of 09–12 months, dogs are largely ready and would be subjected to a BAT at respective locations of the DTBCs. Initial acceptance into the specialized phase of PSK training programme would be determined by the independent Board of Officers (BOO) convened by the MHA comprising of three PSK Trainers including one from host organization every quarter or as per the requirement to formulate the subjective opinion based on the entire BAT procedure. Dogs that 'pass' this behavioural test would be immediately placed into the next phase of specialized training, which usually lasts for additional 06-09 months. If dogs complete the specialised phase of training and attain the training certification, they enter their working life within the respective CAPFs or the other security organization for which they have been prepared at the age ranging between 18 months to 24 months.

24. Dogs not passing the initial BAT, or dogs being rejected during the 06-09 months of the specialized training period, would be auctioned as companion animals or disposed of under the provisions of the separate SOP earlier issued by the MHA on the subject of the cast and boarding out of PSKs. Rejections from specialized training are most normally for behavioural reasons (i.e., high levels of chronic stress in the kennel environment, and/or not capable of completing training tasks) but sometimes may occur due to medical conditions, not detected earlier in life or developed subsequently during the training period. Decisions to certify a PSK/reject from training are made again by the similar independent BOO convened by the MHA quarterly or as per requirement, to ascertain the performance of specialized training of PSK against laid down performance standards i.e. minimum level operational capabilities (MLOC).

Behaviour Assessment Test (BAT) Procedure

25. The standardized behaviour test is similar to that used in other scientifically conducted working dog programmes. Behaviour tests should always be performed during the day time when the weather is congenial for assessment. A subject dog should be accompanied by the Handler who is routinely responsible for their rearing and training. As stated above, all dogs need to be assessed independently by the three members of the BOO hereinafter called 'Training Assessor' (TA) and the Presiding Officer of the Board would be called as 'Lead Assessor' (LA). The individual BRs and SRs are given by the LA and two TAs would be averaged out to take as the final assessment of the subject

dog. Any major variation in assessment would be separately flagged for further discussion and opinion/intervention/resolve of an independent domain expert or the same is referred to the MHA for an expert opinion if required.

26. All dogs must receive the full complement of **12 sub-tests to measure overall 25 BRs** on the same day; all sub-tests combined take on an average 45 min to complete. However, in cases where the subject dog become extremely fearful, without being able to calm down, testing should be halted immediately.

27. Behavioural tests should be performed in the same order at each test time for every dog as per details given in the next section. Order of selecting dogs throughout the day should be random, however, males to be tested before females to avoid distraction from pre-estrus females on males. Except for two sub-tests (visual startle response and gunfire), sub-tests can easily be carried out indoors in a large training shed or hall or garage-like building with concrete floor and multiple, smaller attached rooms. In each sub-test, one or more BR's are required to be given (**Table 1**). After the full complement of sub-test is completed, the LA and TAs need to give **13 additional SR's** (**Table 2**). All ratings are to be given on a scale from 1 to 5 unless otherwise specified.

Table-1

Operational Definitions of Behaviour Ratings (BRs) Given During the 12 Sub-Tests of the Standardized Behaviour Assessment Test.

Sub-test	Behaviour Rating	Rating Scale				
		1	2	3	4	5
Affability and Handling	Affability (1-5)	Rejects contact, withdraws.	Does not reject contact. No withdrawal.	Does not reject contact. No withdrawal. Makes contact within15 seconds.	Makes spontaneous contact without jumping and vocalization.	Intensive contact with vocalization or jumping at the person.
	Handling (1-5)	Rejects, growls, tries to bite/ escape.	Pulls away, seeks support from the handler.	Accepts handling.	Accepts handling, seeks contact with TA.	Overwhelming contact toward TA when handled.
Leash	Leash (1-4)	Acts on its own. No contact with the handler.	Acts on its own. Attentive when handler demanding.	Follows without handler demanding.	Dependent. Looking for confirmation from the handler.	
Tug-of-war	Tug-of-war (1-5)	Does not take rag.	Takes rag. Let's go before handler pulls.	Takes rag. Let's go when the handler pulls.	Pulls hard on rag but let's go when the handler pulls back hard or make loud noises.	Pulls hard on the rag. Does not let go despite hard resistance or disturbances.
Retrieving	Chasing (1-5)	Does not run after the ball.	Starts running but stop before reaching the ball.	Runs after and takes the ball.	Runs after and carries the ball back to the handler.	Runs after with high intensity and carries ball back to handler.
	Interest in object (1-5)	Does not take the ball.	Grabs ball but let's go immediately.	Grabs ball carries less than 5 s.	Grabs ball carries.	Grabs ball intensely carries.
Dark Room	The reaction in a dark room (1-5)	Attempts to leave the room.	Freezes when light is out.	Walks into the room less than 3 m and stops.	Investigates but is affected. Goes to puppy handler but with help.	Investigates without hesitation or finds puppy handler directly.

Metal stair	Metal stair (1-5)	Refuses to follow puppy raiser.	Starts to follow but then refuses after some steps.	Manages to walk the whole stairway but with major hesitation.	Easily walks the stairway, but with slight hesitation.	Walks the stairway without hesitation.
Unstable table	Reaction on table (1-5)	Tries to escape before the table is moving.	Tries to escape when the table is moving.	Visibly uncomfortable with a low tense body posture but does not try to escape.	Tense but not annoyed.	Unaffected. The dog is just standing still while the table is moving.
	Object (1-3)	Does not take the ball.	Takes ball but let's go when table moves.	Holds ball despite moving table.		
Acoustic startle	Flight distance * (1-5)	Escapes >5 m.	Escapes 2–5 m.	Escapes 1–2 m	Takes one or two steps backwards without escaping.	No fear response.
	Secondary response (1-5)	Does not want to investigate buckets despite encouragement.	Investigates buckets but only with major encouragement.	Investigates buckets with some help from handler.	Investigates buckets without help but with hesitation.	Investigates buckets without hesitation.
	Lasting effect (1-5)	Very affected. Persistent avoidance.	Affected. Is passing but active avoidance.	A bit affected. Change in body posture when passing.	Unaffected but is looking at an object.	No lasting effect.
Visual startle	Flight distance * (1-5)	Escapes >5 m.	Escapes 2–5 m.	Escapes 1–2 m.	Jerks without escaping.	No fear response.
	Aggression (1-5)	No sign of aggression, i.e. piloerection, barking or growling.	Some sign of aggression. Barking or piloerection.	Clear signs of aggression, piloerection or growling.	Strong aggression, including mouth threat.	Attacks and bites the coverall.
	Secondary response (1-5)	Does not investigate coveralls.	Investigates coveralls with major encouragement.	Investigates coveralls with some encouragement.	Investigates coveralls without help but with hesitation.	Investigates coveralls without hesitation.
	Lasting effect (1-5)	Very affected. Persistent avoidance of coverall.	Affected. Passes but shows active avoidance of coverall.	Mildly affected. Change in body posture when passing.	Unaffected but is looking at an object when passing.	No lasting effect.
Gradual visual startle	Fearfulness (1-5)	Freezes or tries to escape.	No reaction.	Switches between fight/flight responses.	Strong fight reaction toward the figure, but without attack.	Attacks and bites figure.
	Aggression (1-5)	No sign of aggression, i.e. piloerection, barking, growling.	Some sign of aggression. Barking or piloerection.	A clear sign of aggression, piloerection.	Strong aggression, growls, mouth threat.	Bites.
	Secondary response (1-5)	Does not investigate figure.	Investigates figure with major encouragement.	Investigates figure with some encouragement.	Investigates figure without help but with hesitation.	Investigates figure without hesitation.
	Lasting effect (1-5)	Very affected. Persistent avoidance of figure	Affected. Passes but shows active avoidance of figure.	Mildly affected. Change in body posture when passing.	Unaffected but is looking at the object when passing.	No lasting effect.

Search	Intensity (1-5)	Does not search.	Searches but stops.	Searches from different directions.	Searches intensively use mouth or paws.	Searches intensively use mouth and paws.
	Persistence (1-5)	Does not start the search	Searches <10 s.	Searches <1 min.	Searches <2 min.	Searches <2 min.
Gunfire	Fearfulness (1-4)	Very fearful, tries to escape* in leash.	Stops playing, not playful afterwards.	Stops playing, cannot be encountered in play afterwards.	No reaction.	
	Curiosity (1-5)	No reaction.	Stops playing, looks in direction of gunfire.	Stops playing, pulling on the leash in direction of gunfire.	Stops playing, want to investigate, whines, whimpers.	Very excited, pulling on the leash in direction of gunfire cannot be calmed.

* Escapes means turning away180^0 from the stimulus source and moving away.

Table-2

Operational Definitions of SRs given during the Standardized Behavioural Test. Each Trait is Rated from 1 to 5, with 1 Representing 'Low Expression' of a Trait, and 5 Representing 'High Expression' of a Trait.

Trait (SRs) (1-5)	**Definition**
Affability	The dog's comfort level and interaction with people. Synonymous with 'sociability' with humans.
Competitiveness	Displaying a strong desire to have sole possession of objects.
Hunting drive	The dog's willingness, vigour, or enthusiasm to run after a moving object.
Environmental sureness	The dog's ability to cope with a variety of noxious physical environmental stimuli or disturbances.
Courage	The absence of fearful behaviour toward real or imagined danger; such as the ability to rebound from unnerving situations.
Nerve stability	The appropriateness of the dog's reaction to a certain situation. This includes the dog's ability to adapt to various types of non-fearful situations, to concentrate when highly aroused or in a situation of conflict, as well as its ability to relax and to overcome a frightening situation.
Hardness	A mental and/or physical resiliency to unpleasant experiences. Hard dogs are highly "recoverable" after disturbances.
Liveliness	The dog's general mental and physical arousal.
Sharpness	An act of aggression or agonistic interaction. It can be appropriate or inappropriate and involve a threat, challenge or contest.
Defence drive	The tendency for the dog to defend itself or its handler. In most cases, the defence is combined with aggression. However, a dog may show defensive tendencies without being aggressive.
Cooperation	The tendency to be influenced by the handler without being given a direct command or sign.
Prey drive	The dog's interest in objects, its willingness to search for, to bite and to carry them in the mouth.
Curiosity	A tendency to explore and to investigate new things.

Specific Sub-Test Procedure and Behavioural Ratings (BRs)

28. The 12 sub-tests are designed to determine one or more BRs in each subtest, total comprising a total of 25 BRs. Each BR should be graded on a 1–5 scale with 1 indicating a lack of expression and a 5 indicating a high degree of expression of that trait. The BRs are assigned either on a 1–3 scale (object), a 1–4 scale (leash BR and fear BR from the gunfire sub-test), or a 1–5 scale (all remaining 22 ratings). These sub-tests and BRs are defined as under:

(a). **Affability and Handling Sub-test**

The dog on a leash is led through a group of 2–5 passive persons not familiar to the dog for approximately 1 min. The passive persons are instructed not to actively interact or make contact with the dog. Next, the TA should take over the leash, and then physically examine the dog (i.e. teeth inspection, palpation of legs and paws) for approximately 1 min. Two BRs are given during this sub-test, one based on the subject's reaction to the unknown people (affability), and one based on the subject's reaction to being handled by the TA (handling). For both ratings, higher scores indicate dogs that are more sociable and less withdrawn, fearful, or aggressive, and lower scores indicate the opposite.

(b) **Leash Sub-test**

Next, the TA should walk the dog on a leash for 1 minute while haphazardly and repeatedly changing direction. One BR is given during this sub-test, based on the subject's attentiveness to the training assessor (leash). Higher scores indicate more dependence on cues given by the TA by dogs while on lead, and lower scores are given to dogs that pay less attention to the TA while walking. Leash response is rated on a 1–4 scale.

(c) **Tug-of-War Sub-test**

After stopping from the leash sub-test, the TA should invite the dog to a tug-of-war with a cotton rag. The dog is encouraged to bite and to pull on the rag for 2 min. One BR is given, based on the subject's interest in playing tug-of-war. Higher scores are given to dogs with greater interest.

(d) **Retrieving Sub-test**

Next, the TA should remove the cotton rag from visual sight, and rolls a tennis ball over the floor approximately 15 m away; the dog is allowed to chase and to retrieve the ball. Chase and retrieval are performed three times. Based on observations across all three episodes of retrieving, two BR's are given. The first is based on the subject's intensity of chasing the ball (chasing), and the second BR is based on the subject's intensity of physical possession of the ball (interest in the object). Higher chasing scores are given to dogs that are faster and more enthusiastic while chasing, and higher interest in object scores are given to those individuals that are physically possessive of the ball once retrieved.

(e) **Dark Room Sub-test**

After the retrieving test, the TA should lead the subject on a leash to the door of a small, 5 m × 5 m windowless room. The puppy handler should enter the room in full view of the subject but then crouches in an opposite corner, behind an opaque barrier where the subject is unable to see him/her. The light is then turned off and the puppy handler calls for the subject. One BR is given in this sub-test (reaction in a dark room). Higher scores are given to dogs that investigate the room and go to the puppy handler with less encouragement. Lower scores are given to dogs that freeze or try to withdraw from the dark room.

(f) Metal Stair Sub-test

Next, the TA should take the leash and follow the puppy handler who walks outside of the dark room into the main test building area to a flight of steep metal stairs. The TA and subject on leash follow the puppy handler up and down the stairs. After the subject goes up and down the steep stairs on lead, the situation is repeated twice more. One BR is given (metal stair) based on only the third response to the metal stairs. Higher scores for metal stair are given to dogs that confidently walk up and down the stairs, while lower scores are given to dogs that hesitate or that refuse to follow the puppy handler.

(g) Unstable Table Sub-test

After the metal stairs, the subject should be led on a leash by the puppy handler to an adjacent room and is asked to jump up on a table approximately 60 cm high. Once the subject has settled on the top of the table the TA wobbles the table back and forth, displacing it 2–3 cm. While the table is still moving the TA offers a tennis ball to the subject. Two BRs are given during this sub-test, based on a subject's reaction to the moving table (reaction on the table) and the offered ball (object). High reaction on table scores are given to more confident dogs, and made no attempts to escape to the floor; lower scores are given to dogs that are noticeably affected by standing on the table or having it move, or that tries to escape. Similarly, high object scores are given to dogs that took and hold on to the tennis ball during table movement; lower object scores are given to dogs that do not take the ball or let go of the ball when the table moves.

(h) Acoustic Startle Sub-test

Next, while the subject is being walked on a leash by the puppy handler to a different room in the test building, a pair of steel buckets are dropped on the floor approximately 2 meters from the subject. The puppy handler is told to let go of the leash as the buckets are dropped. The dog is encouraged to investigate the buckets; the puppy handler then regains the leash and walks the subject around the room, passing the fallen buckets three more times. Three BR's are taken in this sub-test (flight distance, secondary response, and lasting effect). Higher scores for flight distance are given to dogs that give no fear response or do not react by trying to escape in response to the falling buckets. Lower flight distance scores are given to dogs that try to escape, i.e., turned around 180° from the stimulus source and initially increase their distance from the disturbance. Further, higher scores for secondary response are given to dogs that immediately investigate the buckets, and lower scores are given to dogs that do not investigate the buckets afterwards. Subsequently, low lasting effect scores are given to dogs that are visibly disturbed, i.e., attempts to avoid the buckets when passing them on a leash. High scores are given to dogs that do not pay attention to the buckets even when passing by on the leash the first time.

(i) Visual Startle Sub-test

After the acoustic startle sub-test, the puppy handler leads the dog away from the area of the buckets. Two meters in front of the dog a life-sized coverall (dummy), resulting in the shape of an 'X', is pulled into the air by the TA, and the puppy handler releases the leash. After the dog has made its initial reaction and investigated the dummy, the puppy handler regains the leash and walks the dog past the coveralls until no sign of attention is observed. Four BR's are given

during this sub-test (flight distance, aggression, secondary response, and lasting effect). Flight distance has the identical definition of the flight distance BR given in acoustic startle sub-tests. Higher aggression scores are given to dogs that growl, threaten, and bite the coveralls, while lower aggression scores are given to dogs that show very little or no signs of threatening postures or vocalizations. Similarly, higher scores for secondary response are given to dogs that immediately investigate the coverall and lower scores are given to dogs that refused to investigate or do so only after being encouraged by the handler. Following this, lower lasting effect scores are given to dogs that look at or continually attempt to physically avoid the coveralls. Higher lasting effect scores are given to dogs that pay no visible attention to the coveralls when passing it on a leash.

(j) Gradual Visual Startle Sub-test

In this sub-test, a paper figure, the top half of a person, is mounted on two wooden planks. The eyes of the figure are prominent and the planks are held at an angle so that it is facing the subject. The puppy raiser, standing beside the TA, holds the subject on a leash while the figure/planks are pulled into view 15 meters from the subject. The figure/planks are then slowly moved towards the subject and stopped at a 3-meter distance from the subject, and the subject is released from the lead. Once the subject has physically inspected the paper figure the puppy walker takes the subject on a leash and walks back and forth close to the figure three times. Four BR's are given during this sub-test (fearfulness, aggression, secondary response, and lasting effect). Higher fearfulness scores are given to dogs that do not attempt to escape, and even proactively approach or attack the figure; whereas lower fearfulness scores are given to dogs that have aversive reactions, or those that freeze or try to escape. Further, higher aggression scores are given to dogs that physically threaten or bite the figure, whereas low scores are given to dogs showing no signs of aggression, i.e., barking, piloerection, etc. Subsequently, higher secondary response scores are given to dogs that immediately investigated the figure once they are sent free, however lower scores are given to dogs not willing to investigate the figure even when helped by the puppy raiser. Lastly, higher lasting effect scores are given to dogs that pay no attention to the figure whatsoever even when passing it close on a leash the first time while lower scores are given to dogs that continue to look at or try to avoid the figure even after passing it the third time.

(k) Search Sub-test

The puppy handler next leads the subject away from the paper figure by its collar and then rolls a tennis ball towards the TA who hides the ball under a wooden pallet. When the ball has been hidden the subject is released and allowed to independently search. If the subject does not find the ball within 2 minutes or if it loses interest after this time, it is encouraged and helped by the TA until it retrieves the ball. Hiding and searching for the tennis ball is repeated three times. Two BR's are given in this sub-test (intensity and persistence). Higher scores for intensity are given to dogs that show greater interest in searching and tend to use different search strategies, e.g., mouthing the pallet and/or using paws, while lower intensity scores are given to dogs that do not show interest in searching. Following this, higher scores for persistence are given to dogs that are willing to spend more time unassisted searching for the hidden tennis ball, while lower persistence scores are given to dogs that spend less time searching independently and seek assistance.

(l) **Gunfire Sub-test**

In the final sub-test, the subject is taken outdoors on a leash by the puppy handler. Two, 9-mm blank shots or equivalent are fired from 25 m away out of the visual sight of the subject. The TA then engages the subject in a tug-of-war for approximately 1 minute and another two shots are fired. Two BRs are given during the gunfire sub-test (fearfulness and curiosity). Fear BR's are given on a 1–4 scale. Higher fearfulness scores are given to dogs that are passive or do not react to the gunfire; whereas lower fearfulness scores are given to dogs that quit playing or that try to escape after the gunfire. Similarly, higher curiosity scores are given to dogs that show a desire to investigate, whine or a whimper, or pull toward the place where the gunfire came from, while lower curiosity scores are given to dogs that simply stop playing but do not show any interest in investigating.

Subjective Ratings (SRs)

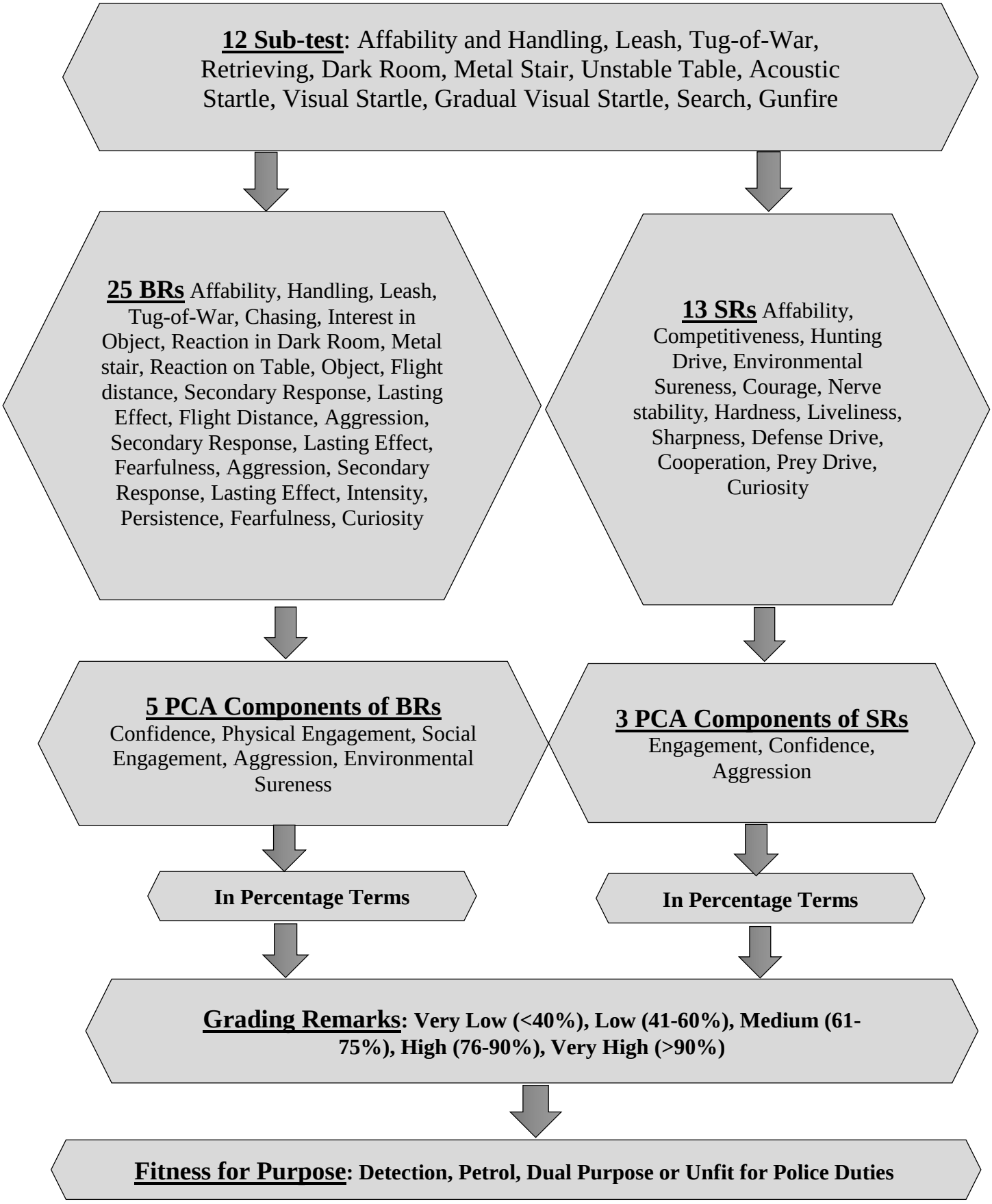
29. Thirteen SR's are required to be given by the LA & TAs to each subject after all sub-tests; each SR should be rated on a 1–5 scale with 1 indicating a lack of expression and a 5 indicating a high degree of expression of that trait (Table 2). All SRs are based on observations across multiple sub-tests; two SRs (i.e., 'liveliness' and 'curiosity') are based on observations across all sub-tests. As opposed to the BR ratings, which may not be available to anyone besides the LA & TAs, SR ratings should be made available to the DTBC training staff for better judgement and monitoring during the next i.e. specialized phase of training. Since dogs represent a high economical value, so all efforts must be made by the trainers and instructors to have the dog succeed in specialized trade training.

Data Analysis

30. It would take time and effort in understanding each of the BRs and definition of traits if using the SR protocol. To learn the process with the intended purpose, the assessors would have to work along with a skilled trainer/assessor who can explain really what is being looked into in each sub-test with regards to BRs and SRs. In the beginning, nominated officers from each CAPFs should perform the assessments under the guidance of Dr PK Chug, Consulting Director of MHA Police K9 Cell for better understanding of each test/sub-test, recording of data and the analysis of outcomes. Further, it would take prolonged time in generating own data and benchmarks more realistically, that would serve as baseline and enabler in decision making. However, till such time the own data is generated by testing a minimum of 100 dogs in the beginning by each organization, we may take into account the results obtained by SDTC for benchmarking. For this purpose, we may reliably depend on the findings based on their vast database of assessment and analysis to determine the structure of the underlying dimensions of dog behaviour present during each test situations. **The Model/Framework of K9 BAT is given in Figure-1 for an easy understanding.**

31. Principal Components Analysis (PCA) was used for the two rating methods. For the PCA using BR's, the 25 single ratings were first standardized since ratings were given either on a 1–3 scale (object), a 1–4 scale (leash BR and fear BR from the gunfire sub-test), or a 1–5 scale (all remaining 22 ratings). The correlation matrix of the standardized BRs was deemed to be appropriate for PCA concerning both BRs and SRs. For component interpretation, variables with a loading of at least ±0.40 (rounded to the nearest one-hundredth) were considered to contribute to the meaning of a component. For both PCAs, orthogonal varimax and oblique direct-oblimin rotated solution matrices were examined, and both methods resulted in an exact (SR data) or similar (BR data) pattern of loadings of measured variables; oblique methods in the case of BRs resulted in the best simple structure, so oblique results here for both measurement method types are considered here for data analysis. SPSS 19.0.0 was used to implement all PCA estimations.

Figure-1: MODEL/FRAMEWORK OF K9 BEHAVIOUR ASSESSMENT TEST (K9 BAT)



32. Aggregate behaviour scores were generated by SDTC based on the pattern of loadings that were obtained in PCA solution matrices. Average unit-weighted scores were calculated by averaging the standardized ratings that were highly loaded for a particular component identified in PCA. For example, six SRs that clustered with themselves but not with other variables were 'competitiveness', 'hunting drive', 'liveliness', 'cooperation', 'prey drive', and 'curiosity'. Thus, to create an aggregate score for the broader dimensions identified in PCA, the ratings given for these six SRs were averaged. **Separate component scores for each dog for each component and every rating method was computed, resulting in eight unique scores per dog** (five component scores for BR method and three-component scores for SR method,). To establish all three SR component scores to have the same meaning of direction and all five BR component scores to have the same directionality, reverse coding for the loadings obtained in PCA3 and PCA5 previous to creating aggregate scores was achieved. Average unit-weighting was used instead of regression methods to generate scores because PCA loadings remain sensitive to sample sizes and to facilitate future attempts for an independent study validation.

33. **Five components from the PCA performed on the BRs were chosen as the best fit of the data, accounting for 60% of the variance in the original BRs themselves (Table 3).** The component names were chosen based on the definitions of the items that loaded strongly on each component based on a study undertaken by SDTC and in conjunction with previous research. **The first component, named as 'confidence'**, consisted of ratings related to reactivity/sensitivity (acoustic startle flight distance, visual startle flight distance, gunfire fear), environmental stability (acoustic startle lasting effect, visual startle lasting effect, gradual startle lasting effect) and investigation (visual startle secondary response, gradual startle secondary response, gradual startle fearful-ness). All had high positive loadings on this component. **The second component, named 'physical engagement'** here, described dogs that varied for their willingness to be engaged in activities related to inanimate objects. The BRs leash, tug-of-war, chasing, interest in objects, object ratings from the unstable table sub-test, search intensity and persistence all loaded positively with one another on the second component. **Similarly, component three described a continuum of dogs that varied for their levels of 'social engagement'**: affability, handling, leash, and curiosity from gunfire sub-tests all covaried with one another. **The fourth component, named 'aggression',** described differences amongst dogs in their aggression ratings from visual startle sub-tests, and fearfulness and aggression ratings from gradual visual startle sub-tests. **Finally, the fifth component described a continuum of dogs that varied in their 'environmental sureness'**: ratings from the dark room sub-test, the metal stair sub-test, and the three ratings taken from the acoustic startle sub-test (flight distance, secondary response, and lasting effect) all loaded highly on this final component. Component correlations amongst the five BR components varied from small to moderate.

34. **Three components from the PCA performed on the SRs in the training data were chosen as the best fit of the data, accounting for 64.4% of the variance in the original SRs themselves (Table 4). The first component, named 'engagement'**, consisted of ratings related to a dog's willingness to engage with physical and social factors in its environment. The traits competitiveness, hunting drive, liveliness, cooperation and curiosity all loaded high in this factor. **The second component, named 'confidence' here**, described dogs that varied for their affability, environmental sureness, courage, nerve stability and hardness. **Similarly, the third component described the levels of aggression**: sharpness, defence drive and affability (negative loading).

Table 3

Component loadings of behavioural rating single items on five obliquely rotated principal components. Only the highest component loading(s) for each rating are considered. A: acoustic startle sub-test; V: visual startle sub-test; G: gradual visual startle sub-test; GF: gunfire sub-test.

Sub-test	Behaviour Ratings	Principal Components				
		Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability and Handling	Affability	-	-	**0.76**	-	-
	Handling	-	-	**0.80**	-	-
Leash	Leash	-	**0.37**	**0.64**	-	-
Tug-of-war	Tug-of-war	-	**0.70**	-	-	-
Retrieving	Chasing	-	**0.78**	-	-	-
	Interest in object	-	**0.74**	-	-	-
Dark room	Reaction in dark room	-	-	-	-	**0.56**
Metal stair	Metal stair	-	-	-	-	**0.62**
Unstable table	Reaction on table	-	-	-	-	**0.71**
	Object	-	**0.66**	-	-	-
Acoustic startle	A. Flight distance	**0.38**	-	-	-	**0.45**
	A. Secondary response	-	-	-	-	**0.46**
	A. Lasting effect	**0.52**	-	-	-	**0.41**
Visual startle	V. Flight distance	**0.79**	-	-	-	-
	V. Aggression	-	-	-	**0.86**	-
	V. Secondary response	**0.81**	-	-	-	-
	V. Lasting effect	**0.87**	-	-	-	-
Gradual visual startle	G. Fearfulness	**0.63**	-	-	**0.37**	-
	G. Aggression	-	-	-	**0.74**	-
	G. Secondary response	**0.71**	-	-	-	-
	G. Lasting effect	**0.78**	-	-	-	-
Search	Intensity	-	**0.82**	-	-	-
	Persistence	-	**0.79**	-	-	-
Gunfire	GF. Fear	**0.41**	-	-	-	-
	Curiosity	-	-	**0.37**	-	-

Table 4

Component loadings of subjective rating single items on three obliquely rotated principal components. Only the highest component loading(s) for each rating are considered.

Subjective Ratings	Principal Components		
	Engagement	Confidence	Aggression
Affability	-	**0.53**	**0.56**
Competitiveness	**0.81**	-	-
Hunting drive	**0.88**	-	-
Environmental sureness	-	**0.56**	-
Courage	-	**0.66**	-
Nerve stability	-	**0.88**	-
Hardness	-	**0.79**	-
Liveliness	**0.82**	-	-
Sharpness	-	-	**0.86**
Defense drive	-	-	**0.73**
Cooperation	**0.75**	-	-
Prey drive	**0.81**	-	-
Curiosity	**0.72**	-	-

Relative Predictive Validity of SR and BR Measurement Methods

35. In general, there are two basic methods for measuring the behaviour of working dogs i.e. behaviour and subjective ratings. The fundamental difference between these two rating methods is the level of generalizability or aggregation required by observers, that occurs. As per established protocol, increased generalizability or aggregation of a measure should improve its predictive validity since it would reduce error variance. However, both the measurement methods have been reported with high, and similar, levels of predictive validity with regards to success in training outcomes (70.3–78.3% correct classifications). The SDTC observed that the dimensions of confidence and engagement (physical, rather than social) are the strongest predictors of whether a dog passed or failed using both the tests. Aggression (both BR and SR methods), the BR environmental sureness, and the BR social engagement in both cases had little predictive validity if any. The choice of measurement method (BR or SR) may have little consequence, from the standpoint of predictive validity.

Data Interpretation

36. Each candidate dog (green dog) would be subjected to the BR and SR assessment as given above on a scale of 1-5, with one reflects the low levels and five reflects the maximum dimension of the behaviour. It was established that 25 BRs can be reduced to 5 underlying behavioural dimensions and that all the 13 SRs can be reduced to 3 dimensions that were named BR confidence, BR physical engagement, BR social engagement, BR aggression, BR environmental sureness, SR engagement, SR confidence, and SR aggression. The individual BR scale is then revalued/re-adjusted depending upon component loadings as per the 05 PCA factors identified earlier for BR. Similarly, in the case of SR scale, the component loading of the data is achieved based on 03 PCA factors. **For the ease of calculation, only the highest component loading(s) for each rating are considered and rest are considered not significant (zero) to avoid any confusion**. The maximum score after component loading in BR scale can be 89.81 (comprising of 29.09 BR Confidence, 22.61 BR Physical Engagement, 12.21 BR Social Engagement, 9.85 BR Aggression and 16.05 BR Environmental Sureness). The maximum score after component loading in SR scale can be 51.8 (comprising of 23.95 SR Engagement, 17.1 SR Confidence and 10.75 SR Aggression). The BR/SR scales after component loadings are evaluated for each of the above mentioned 05/03 PCA factors on gradual levels in ascending order in a range of Very Low, Low, Medium, High and Very High.

37. The interpretation of BR data after component loadings on 05 PCA factors is given in **Table 5** in terms of suitability of the dog for the specialized purpose. Similarly, the interpretation for SR data after component loadings on 03 PCA factors is given in **Table 6**.

Table 5

Interpretation of BR data to ascertain suitability of the dog for purpose after component loadings on 05 PCA factors

BR Levels after Component Loadings	PCA Factors for Component Loadings as per Weightage				
	BR Confidence	**BR Physical engagement**	**BR Social engagement**	**BR Aggression**	**BR Environmental sureness**
Very Low (<40%)	Unfit for Detection	Unfit for Detection	Unfit for Detection	**Unfit for Patrol**	Unfit for Detection
Low (41-60%)					
Medium (61-75%)	Fit for Detection & Patrol		Fit for Detection	**Fit for Patrol**	Fit for Detection & Patrol
High (76-90%)		Fit for Detection			
Very High (>90%)					

Table 6

Interpretation of SR data to ascertain suitability of the dog for purpose after component loadings on 05 PCA factors

SR Levels after Component Loadings	PCA Factors for Component Loadings as per Weightage		
	SR Engagement	SR Confidence	SR Aggression
Very Low (<40%)	Unfit for Detection	Unfit for Detection	**Unfit for Patrol**
Low (41-60%)			
Medium (61-75%)		Fit for Detection	**Fit for Patrol**
High (76-90%)	Fit for Detection & Patrol		
Very High (>90%)			

38. The self-explanatory 'operating procedure' of K9 BAT based on BR method and the SR method is given at Annexure-I and II, respectively. Further, for the ease of understanding, these calculations and their interpretations in terms of the suitability for the purpose are provided in detail with the help of taking different dogs as an example under BR method from Annexure-III to VI and for SR rating method at Annexure-VII to X, respectively. **Accordingly, the observations and results of assessment by BR and SR method can be recorded in the format of K9 BAT assessment, given at Annexure-XI and XII, respectively.**

Summary

39. It is vital to undertake behaviour assessment of the dogs before the commencement of the specialized training however the age at which it can be reasonably carried out is a matter of choice. However, it is established from the research after a long term assessment that it is reasonable to undertake such assessments when the dog is a young adult (i.e. 09-12 months of age). These assessments can be carried out either by BR or SR method, however, from the stand-point of predictive validity, use of either of these rating measurement methods (BR or SR) sometimes may not matter, and remains largely a matter of choice (or logistics) by the working dog programmes. However, precise, more situation-specific traits (e.g., specific aspects of engagement) may be necessary to capture for a particular working dog programme in some cases, while for other types of programmes or traits (such as general confidence or aggression) this may not be the case, and more generalizable measures (i.e., SRs) are more efficient and logistically feasible. Notwithstanding, it emphasizes the need for more explicit, quantitative continuous assessments at various stages to ensure higher 'success rate' in working dog programmes to achieve the minimum level operational capabilities laid out for various trades of dog training. It may be difficult for working dog programmes to make choices regarding the measurement methods that they could use to capture relevant behavioural variation observed in their dogs earlier in life.

Acknowledgements

Swedish Dog Training Centre (SDTC) for Armed Forces and Police.

Annexure-I

OPERATING PROCEDURE FOR K9 BAT BR METHOD

STEP-I:

Young adult dog 'DRONA' (age 9-12 months) is brought before the 'Board of Officers' comprising of Lead Assessor (LA) and Technical Assessor (TA) for assessment. The dog is accompanied by its handler on a leash.

STEP-II:

Dog DRONA is subjected to following 12 behavioural assessment tests whose process of conducting is described in Para 28 of the SOP. A total of 25 BRs on a scale of 1-5/1-4/1-3 (as specifically mentioned against each) is accorded based on the display of the behaviour in each test/sub-test as per undermentioned Table 7.

Table 7
Sub-Tests of the Standardized K9 BAT.

S. No.	Sub-test	BR	BR Score Before CL
1.	**Affability and Handling**	Affability (1-5)	3
		Handling (1-5)	3
2.	**Leash**	Leash (1-4)	4
3.	**Tug-of-war**	Tug-of-war (1-5)	5
4.	**Retrieving**	Chasing (1-5)	5
		Interest in the object (1-5)	4
5.	**Dark room**	The reaction in the dark room (1-5)	4
6.	**Metal stair**	Metal stair (1-5)	5
7.	**Unstable table**	Reaction on the table (1-5)	4
		Object (1-3)	4
8.	**Acoustic startle**	The flight distance (1-5)	4
		Secondary response (1-5)	4
		Lasting effect (1-5)	4
9.	**Visual startle**	The flight distance (1-5)	5
		Aggression (1-5)	2
		Secondary response (1-5)	4
		Lasting effect (1-5)	5
10.	**Gradual visual startle**	Fearfulness (1-5)	2
		Aggression (1-5)	2
		Secondary response (1-5)	4
		Lasting effect (1-5)	4
11.	**Search**	Intensity (1-5)	5
		Persistence (1-5)	4
12.	**Gunfire**	Fearfulness (1-4)	4
		Curiosity (1-5)	3
Total Score			97
Maximum Score			121

STEP-III:

In this step, each Behavioural Rating (BR) is multiplied by respective Components Loading (CL) as shown in each cell that it's a multiplication of the BR score obtained and the respective component loading factor on five principal components as given in Table 3 of the SOP.

Further, the sum of all the 5 principal components is calculated considering relevant BR score (after component loading). 25 BR scores are calculated and the table is further developed. Next action is to calculate each of the 5 principal components in percentage (%) terms by dividing each term with the maximum score. The maximum score is taken considering that the dog has scored maximum possible value in each of the 12 sub-tests/25 BRs on the scale of 1-3/1-4/1-5 (as per the case). Finally, the following Table 8 is obtained by dividing each value by maximum possible value and multiplied by 100 to convert the values in percentage (%) terms.

Table 8
BRs under different Sub-tests Before and after CL on Five Principal Components

Sub-test	BR	BR Score Before CL	BR Score after CL on 05 Principal Components (BR x CL Factor)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	3	-	-	3*0.76=2.28	-	-
	Handling	3	-	-	3*0.80=2.4	-	-
Leash	Leash	4	-	4*0.37=1.48	4*0.64=2.56	-	-
Tug-of-war	Tug-of-war	5	-	5*0.70=3.5	-	-	-
Retrieving	Chasing	5	-	5*0.78=3.9	-	-	-
	Interest in object	4	-	4*0.74=2.96	-	-	-
Dark room	The reaction in dark room	4	-	-	-	-	4*0.56=2.24
Metal stair	Metal stair	5	-	-	-	-	5*0.62=3.1
Unstable table	Reaction on table	4	-	-	-	-	4*0.71=2.84
	Object	4	-	4*0.66=2.64	-	-	-
Acoustic startle	Flight distance	4	4*0.38=1.52	-	-	-	4*0.45=1.8
	Secondary response	4	-	-	-	-	4*0.46=1.84
	Lasting effect	4	4*0.52=2.08	-	-	-	4*0.41=1.64
Visual startle	Flight distance	5	5*0.79=3.95	-	-	-	-
	Aggression	2	-	-	-	2*0.86=1.72	-
	Secondary response	4	4*0.81=3.24	-	-	-	-
	Lasting effect	5	5*0.87=4.35	-	-	-	-
Gradual visual startle	Fearfulness	2	2*0.63=1.26	-	-	2*0.37=0.74	-
	Aggression	2	-	-	-	2*0.74=1.48	-
	Secondary response	4	4*0.71=2.84	-	-	-	-
	Lasting effect	4	4*0.78=3.12	-	-	-	-
Search	Intensity	5	-	5*0.82=4.1	-	-	-
	Persistence	4	-	4*0.79=3.16	-	-	-
Gunfire	Fearfulness	4	4*0.41=1.64	-	-	-	-
	Curiosity	3	-	-	3*0.37=1.11	-	-
TOTAL SCORE (Sum of scores in each column)		97	**24**	**21.74**	**8.35**	**3.94**	**13.46**
Maximum Score (Maximum possible score in each column)		121	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage Terms (%)			**(24/29.09) *100= 82.5%**	**(21.74/22.61)*100= 96.15%**	**(8.35/12.21 *100= 68.38%**	**(3.94/9.85) *100= 40%**	**(13.46/16.05)* 100= 83.86%**

STEP-IV:

Each BR in percentage (%) term is compared using Table 5 of the SOP and respective grading is given for final inference of the behaviour assessment as per undermentioned Table 9.

Table 9
BRs under different Sub-tests Before and After CL on Five Principal Components

Sub-test	BR	BR Score Before CL	BR Score after CL on 05 Principal Components (BR x CL Factor)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	3	-	-	3*0.76=2.28	-	-
	Handling	3	-	-	3*0.80=2.4	-	-
Leash	Leash	4	-	4*0.37=1.48	4*0.64=2.56	-	-
Tug-of-war	Tug-of-war	5	-	5*0.70=3.5	-	-	-
Retrieving	Chasing	5	-	5*0.78=3.9	-	-	-
	Interest in object	4	-	4*0.74=2.96	-	-	-
Dark room	Reaction in dark room	4	-	-	-	-	4*0.56=2.24
Metal stair	Metal stair	5	-	-	-	-	5*0.62=3.1
Unstable table	Reaction on table	4	-	-	-	-	4*0.71=2.84
	Object	4	-	4*0.66=2.64	-	-	-
Acoustic startle	Flight distance	4	4*0.38=1.52	-		-	4*0.45=1.8
	Secondary response	4	-	-	-	-	4*0.46=1.84
	Lasting effect	4	4*0.52=2.08	-	-	-	4*0.41=1.64
Visual startle	Flight distance	5	5*0.79=3.95	-	-	-	-
	Aggression	2	-	-	-	2*0.86=1.72	-
	Secondary response	4	4*0.81=3.24	-	-	-	-
	Lasting effect	5	5*0.87=4.35	-	-	-	-
Gradual visual startle	Fearfulness	2	2*0.63=1.26	-	-	2*0.37=0.74	-
	Aggression	2	-	-	-	2*0.74=1.48	-
	Secondary response	4	4*0.71=2.84	-	-	-	-
	Lasting effect	4	4*0.78=3.12	-	-	-	-
Search	Intensity	5	-	5*0.82=4.1	-	-	-
	Persistence	4	-	4*0.79=3.16	-	-	-
Gunfire	Fearfulness	4	4*0.41=1.64	-	-	-	-
	Curiosity	3	-	-	3*0.37=1.11	-	-
TOTAL SCORE (Sum of scores in each column)		97	**24**	**21.74**	**8.35**	**3.94**	**13.46**
Maximum Score (Maximum possible score in each column)		121	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage Terms (%)			**(24/29.09)*100= 82.5%**	**(21.74/22.61)*100= 96.15%**	**(8.35/12.21*100= 68.38%**	**(3.94/9.85)*100= 40%**	**(13.46/16.05)*100= 83.86%**
GRADING REMARKS			**High** (as it lies in the range 76%-90%)	**Very High** (as it lies in the range >90%)	**Medium** (as it lies in the range 61%-75%)	**Very Low** (as it lies in the range <=40%)	**High** (as it lies in the range 76%-90%)
FITNESS FOR PURPOSE			**Fit for Detection Only**				

Annexure-II

OPERATING PROCEDURE FOR K9 BAT SR METHOD

STEP-I:

Young adult dog 'DRONA' (age 9-12 months) is brought for K9 BAT before the 'Board of Officers' comprising of Lead Assessor (LA) and Technical Assessor (TA) for assessment. The dog is accompanied by its handler on a leash.

STEP-II:

Dog DRONA is subjected to following 12 standardized behavioural assessment tests whose process of conducting is described in detail, at Para 28 of the SOP. These are the tests which are common to the BR method described earlier.

Following the completion of the 12 standardized behavioural rating tests, a total of 13 SRs at the scale from 1-5 are accorded based on the display of the behaviour in each test/sub-test as per undermentioned Table 10.

Table 10
SRs under different Sub-tests

SRs	SR Score Before CL
Affability	3
Competitiveness	5
Hunting drive	5
Environmental sureness	4
Courage	3
Nerve stability	3
Hardness	3
Liveliness	4
Sharpness	2
Defence drive	2
Cooperation	3
Prey drive	4
Curiosity	4
TOTAL SCORE	43
Maximum Score	65

STEP-III:

In this step, each SR is multiplied by respective CL concerning each of the three principal components reduced from 13 SRs. As shown in each cell in the Table given under, it is the multiplication of SR score obtained and the respective CL factor on three principal components as given in Table 4 of the SOP.

Further, the sum of all the 3 principal components is calculated considering relevant SR score (after component loading) as shown in the Table. Accordingly, 13 SR scores are considered and the calculation sheet/table is further developed.

Next action is to calculate each of the 3 principal components in percentage (%) terms by dividing each term with the maximum score. The maximum score is calculated considering the dog has scored maximum possible value in each of the 13 SRs on the scale of 1-5 (based on 12 behavioural sub-tests) and hence the maximum possible value is mentioned. Finally, the following calculation Table 11 is developed by dividing each value by maximum possible value and multiplied by 100 to convert the values in percentage (%) terms.

Table 11
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SR	SR Score Before CL	SR Score after CL on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability	3		0.53*3=1.59	0.56*3=1.68
Competitiveness	5	0.81*5=4.05		
Hunting drive	5	0.88*5=4.4		
Environmental sureness	4		0.56*4=2.24	
Courage	3		0.66*3=1.98	
Nerve stability	3		0.88*3=2.64	
Hardness	3		0.79*3=2.37	
Liveliness	4	0.82*4=3.28		
Sharpness	2			0.86*2=1.72
Defense drive	2			0.73*2=1.46
Cooperation	3	0.75*3=2.25		
Prey drive	4	0.81*4=3.24		
Curiosity	4	0.72*4=2.88		
TOTAL SCORE (Sum of scores in each column)	43	**20.1**	**10.82**	**4.86**
Maximum Score (Maximum possible score in each column)	65	**23.95**	**17.1**	**10.75**
In % Terms	**100%**	**(20.1/23.95)*100= 83.92%**	**(10.82/17.1)*100 = 63.27%**	**(4.86/10.75)*100 = 45.20%**

STEP-IV:

Each SR in percentage (%) term is compared based on Table 6 of the SOP and respective grading is assigned to the Dog DRONA for final inference of the assessment based on SR method of K9 BAT as per undermentioned Table 12.

Table 12
SRs under different Sub-tests Before and after CL on Three Principal Components

SR	**SR Score Before CL**	**SR Score After CL on 03 Principal Components (SR x CL)**		
		Engagement	**Confidence**	**Aggression**
Affability	3		0.53*3=1.59	0.56*3=1.68
Competitiveness	5	0.81*5=4.05		
Hunting drive	5	0.88*5=4.4		
Environmental sureness	4		0.56*4=2.24	
Courage	3		0.66*3=1.98	
Nerve stability	3		0.88*3=2.64	
Hardness	3		0.79*3=2.37	
Liveliness	4	0.82*4=3.28		
Sharpness	2			0.86*2=1.72
Defence drive	2			0.73*2=1.46
Cooperation	3	0.75*3=2.25		
Prey drive	4	0.81*4=3.24		
Curiosity	4	0.72*4=2.88		
TOTAL SCORE	43	**20.1**	**10.82**	**4.86**
Maximum Score	65	**23.95**	**17.1**	**10.75**
In Percentage (%) Terms	**100%**	**83.92%**	**63.27%**	**45.20%**
Grading Remarks		**High** (as it lies in the range 76%-90%)	**Medium** (as it lies in the range 61%-75%)	**Low** (as it lies in the range 41-60%)
Fitness for Purpose		**Fit for Detection Only**		

Annexure-III

'DRONA' Police Service K9
Calculation Sheet of K9 K9 BAT
by BR Method

Table 13

Behaviour Ratings under different Sub-tests Before and After Component Loadings on Five Principal Components

Sub-test	Behaviour Rating	BR Score Before CL	BR Score After Component Loading (CL) on 05 Principal Components (BR x Component Loading)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	3	-	-	2.28	-	-
	Handling	3	-	-	2.4	-	-
Leash	Leash	4	-	1.48	2.56	-	-
Tug-of-war	Tug-of-war	5	-	3.5	-	-	-
Retrieving	Chasing	5	-	3.9	-	-	-
	Interest in object	4	-	2.96	-	-	-
Dark room	Reaction in dark room	4	-	-	-	-	2.24
Metal stair	Metal stair	5	-	-	-	-	3.1
Unstable table	Reaction on table	4	-	-	-	-	2.84
	Object	4	-	2.64	-	-	-
Acoustic startle	Flight distance	4	1.52	-	-	-	1.8
	Secondary response	4	-	-	-	-	1.84
	Lasting effect	4	2.08	-	-	-	1.64
Visual startle	Flight distance	5	3.95	-	-	-	-
	Aggression	2	-	-	-	1.72	-
	Secondary response	4	3.24	-	-	-	-
	Lasting effect	5	4.35	-	-	-	-
Gradual visual startle	Fearfulness	2	1.26	-	-	0.74	-
	Aggression	2	-	-	-	1.48	-
	Secondary response	4	2.84	-	-	-	-
	Lasting effect	4	3.12	-	-	-	-
Search	Intensity	5	-	4.1	-	-	-
	Persistence	4	-	3.16	-	-	-
Gunfire	Fearfulness	4	1.64	-	-	-	-
	Curiosity	3	-	-	1.11	-	-
TOTAL SCORE		97	**24**	**21.74**	**8.35**	**3.94**	**13.46**
Maximum Score		121	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage (%) Terms		**100%**	**82.5%**	**96.15%**	**68.38%**	**40%**	**83.86%**
GRADING REMARKS			**High**	**Very High**	**Medium**	**Very Low**	**High**
FITNESS FOR PURPOSE			**Fit for Detection Only**				

Annexure-IV

'BHEEM' Police Service K9
Calculation Sheet of K9 BAT
by BR Method

Table 14

Behaviour Ratings under different Sub-Tests Before and After Component Loadings on Five Principal Components

Sub-test	Behaviour Rating	BR Score Before CL	BR Score After Component Loading (CL) on 05 Principal Components (BR x Component Loading)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	3	-	-	2.28	-	-
	Handling	3	-	-	2.4	-	-
Leash	Leash	3	-	1.48	2.56	-	-
Tug-of-war	Tug-of-war	4	-	3.5	-	-	-
Retrieving	Chasing	4	-	3.9	-	-	-
	Interest in object	3	-	2.96	-	-	-
Dark room	Reaction in dark room	3	-	-	-	-	2.24
Metal stair	Metal stair	4	-	-	-	-	3.1
Unstable table	Reaction on table	3	-	-	-	-	2.84
	Object	3	-	2.64	-	-	-
Acoustic startle	Flight distance	4	1.52	-	-	-	1.8
	Secondary response	3	-	-	-	-	1.84
	Lasting effect	3	2.08	-	-	-	1.64
Visual startle	Flight distance	3	3.95	-	-	-	-
	Aggression	5	-	-	-	1.72	-
	Secondary response	3	3.24	-	-	-	-
	Lasting effect	2	4.35	-	-	-	-
Gradual visual startle	Fearfulness	4	1.26	-	-	0.74	-
	Aggression	5	-	-	-	1.48	-
	Secondary response	3	2.84	-	-	-	-
	Lasting effect	3	3.12	-	-	-	-
Search	Intensity	4	-	4.1	-	-	-
	Persistence	3	-	3.16	-	-	-
Gunfire	Fearfulness	3	1.64	-	-	-	-
	Curiosity	3	-	-	1.11	-	-
TOTAL SCORE		84	**17.84**	**16.88**	**7.71**	**9.48**	**10.7**
Maximum Score		121	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage (%) Terms		**100%**	**61.32%**	**74.65%**	**75.11%**	**96.24%**	**66.67%**
GRADING REMARKS			**Medium**	**Medium**	**High**	**Very High**	**Medium**
FITNESS FOR PURPOSE			**Fit for Patrol Only**				

Annexure-V

'ARJUN' Police Service K9
Calculation Sheet of K9 BAT
by BR Method

Table 15

Behaviour Ratings under different Sub-tests Before and After Component Loadings on Five Principal Components

Sub-test	Behaviour Rating	BR Score Before CL	BR Score After Component Loading (CL) on 05 Principal Components (BR x Component Loading)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	3	-	-	2.28	-	-
	Handling	3	-	-	2.4	-	-
Leash	Leash	4	-	1.48	2.56	-	-
Tug-of-war	Tug-of-war	5	-	3.5	-	-	-
Retrieving	Chasing	4	-	3.9	-	-	-
	Interest in object	4	-	2.96	-	-	-
Dark room	Reaction in dark room	4	-	-	-	-	2.24
Metal stair	Metal stair	4	-	-	-	-	3.1
Unstable table	Reaction on table	3	-	-	-	-	2.84
	Object	4	-	2.64	-	-	-
Acoustic startle	Flight distance	4	1.52	-	-	-	1.8
	Secondary response	3	-	-	-	-	1.84
	Lasting effect	4	2.08	-	-	-	1.64
Visual startle	Flight distance	4	3.95	-	-	-	-
	Aggression	4	-	-	-	1.72	-
	Secondary response	4	3.24	-	-	-	-
	Lasting effect	4	4.35	-	-	-	-
Gradual visual startle	Fearfulness	4	1.26	-	-	0.74	-
	Aggression	4	-	-	-	1.48	-
	Secondary response	3	2.84	-	-	-	-
	Lasting effect	3	3.12	-	-	-	-
Search	Intensity	4	-	4.1	-	-	-
	Persistence	4	-	3.16	-	-	-
Gunfire	Fearfulness	4	1.64	-	-	-	-
	Curiosity	3	-	-	1.11	-	-
TOTAL SCORE		94	**22.11**	**20.14**	**8.35**	**7.88**	**11.67**
Maximum Score		121	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage (%) Terms		**100%**	**76%**	**89.07%**	**68.38%**	**80%**	**72.71%**
GRADING REMARKS			**High**	**High**	**Medium**	**High**	**Medium**
FITNESS FOR PURPOSE			**Fit for Dual Purpose (Detection & Patrol both)**				

Annexure-VI

'PARTH' Police Service K9
Calculation Sheet of K9 BAT
by BR Method

Table 16

Behaviour Ratings under different Sub-tests Before and After Component Loadings on Five Principal Components

Sub-test	Behaviour Rating	BR Score Before CL	BR Score After Component Loading (CL) on 05 Principal Components (BR x Component Loading)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability	2	-	-	2.28	-	-
	Handling	3	-	-	2.4	-	-
Leash	Leash	2	-	1.48	2.56	-	-
Tug-of-war	Tug-of-war	3	-	3.5	-	-	-
Retrieving	Chasing	2	-	3.9	-	-	-
	Interest in object	2	-	2.96	-	-	-
Dark room	Reaction in dark room	2	-	-	-	-	2.24
Metal stair	Metal stair	2	-	-	-	-	3.1
Unstable table	Reaction on table	2	-	-	-	-	2.84
	Object	2	-	2.64	-	-	-
Acoustic startle	Flight distance	1	1.52	-	-	-	1.8
	Secondary response	3	-	-	-	-	1.84
	Lasting effect	2	2.08	-	-	-	1.64
Visual startle	Flight distance	2	3.95	-	-	-	-
	Aggression	2	-	-	-	1.72	-
	Secondary response	1	3.24	-	-	-	-
	Lasting effect	2	4.35	-	-	-	-
Gradual visual startle	Fearfulness	2	1.26	-	-	0.74	-
	Aggression	2	-	-	-	1.48	-
	Secondary response	1	2.84	-	-	-	-
	Lasting effect	2	3.12	-	-	-	-
Search	Intensity	1	-	4.1	-	-	-
	Persistence	2	-	3.16	-	-	-
Gunfire	Fearfulness	2	1.64	-	-	-	-
	Curiosity	1	-	-	1.11	-	-
TOTAL SCORE		**48**	**9.9**	**9.6**	**5.57**	**3.94**	**6.43**
Maximum Score		**121**	**29.09**	**22.61**	**12.21**	**9.85**	**16.05**
In Percentage (%) Terms		**100%**	**34%**	**42.45%**	**45.62%**	**40%**	**40%**
GRADING REMARKS			**Very Low**	**Low**	**Low**	**Very Low**	**Very Low**
FITNESS FOR PURPOSE			**Unfit for Detection & Patrol both**				

Annexure-VII

'DRONA' Police Service K9
Calculation Sheet of K9 BAT
by SR Method

Table 17
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SRs	SR Score Before CL	SR Score After CL on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability	3	-	1.59	1.68
Competitiveness	5	4.05	-	-
Hunting drive	5	4.4	-	-
Environmental sureness	4	-	2.24	-
Courage	3	-	1.98	-
Nerve stability	3	-	2.64	-
Hardness	3	-	2.37	-
Liveliness	4	3.28	-	-
Sharpness	2	-	-	1.72
Defense drive	2	-	-	1.46
Cooperation	3	2.25	-	-
Prey drive	4	3.24	-	-
Curiosity	4	2.88	-	-
TOTAL SCORE	43	**20.1**	**10.82**	**4.86**
Maximum Score	65	**23.95**	**17.1**	**10.75**
In Percentage (%) Terms	**100%**	**83.92%**	**63.27%**	**45.20%**
Grading Remarks		**High**	**Medium**	**Low**
Fitness for Purpose		**Fit for Detection Only**		

Annexure-VIII

'BHEEM' Police Service K9
Calculation Sheet of K9 BAT
by SR Method

Table 18
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SRs	SR Score Before CL	SR Score After CL on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability	3	-	1.59	1.68
Competitiveness	3	2.43	-	-
Hunting drive	3	2.64	-	-
Environmental sureness	4	-	2.24	-
Courage	4	-	2.64	-
Nerve stability	4	-	3.52	-
Hardness	5	-	3.95	-
Liveliness	3	2.46	-	-
Sharpness	5	-	-	4.3
Defense drive	4	-	-	2.92
Cooperation	3	2.25	-	-
Prey drive	3	2.43	-	-
Curiosity	4	2.16	-	-
TOTAL SCORE	48	**14.37**	**13.94**	**8.9**
Maximum Score	65	**23.95**	**17.1**	**10.75**
In Percentage (%) Terms	**100%**	**60%**	**81.52%**	**82.8%**
Grading Remarks		**Medium**	**High**	**High**
Fitness for Purpose		**Fit for Patrol Only**		

Annexure-IX

'ARJUN' Police Service K9
Calculation Sheet of K9 BAT
by SR Method

Table 19
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SRs	SR Score Before CL	SR Score After CL on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability	4	-	2.12	2.24
Competitiveness	5	4.05	-	-
Hunting drive	5	4.4	-	-
Environmental sureness	4	-	2.24	-
Courage	5	-	3.3	-
Nerve stability	5	-	4.4	-
Hardness	4	-	3.16	-
Liveliness	5	4.1	-	-
Sharpness	4	-	-	3.44
Defense drive	4	-	-	2.92
Cooperation	4	3	-	-
Prey drive	4	3.24	-	-
Curiosity	5	3.6	-	-
TOTAL SCORE	58	**22.39**	**15.22**	**8.6**
Maximum Score	65	**23.95**	**17.1**	**10.75**
In Percentage (%) Terms	**100%**	**93.48%**	**89.00%**	**80%**
Grading Remarks		**Very High**	**High**	**High**
Fitness for Purpose		**Fit for Dual Purpose (Detection & Patrol both)**		

Annexure-X

'PARTH' Police Service K9
Calculation Sheet of K9 BAT
by SR Method

Table 20
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SRs	SR Score Before CL	SR Score After CL on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability	2	-	1.06	1.12
Competitiveness	2	1.62	-	-
Hunting drive	2	1.76	-	-
Environmental sureness	3	-	1.68	-
Courage	2	-	1.32	-
Nerve stability	3	-	2.64	-
Hardness	2	-	1.58	-
Liveliness	2	1.64	-	-
Sharpness	2	-	-	1.72
Defense drive	2	-	-	1.46
Cooperation	2	1.5	-	-
Prey drive	2	1.62	-	-
Curiosity	2	1.44	-	-
TOTAL SCORE	28	**9.58**	**8.28**	**4.3**
Maximum Score	65	**23.95**	**17.1**	**10.75**
In Percentage (%) Terms	**100%**	**40%**	**48.42%**	**40%**
Grading Remarks		**Very Low**	**Low**	**Very Low**
Fitness for Purpose		**Unfit for Detection & Patrol both**		

Annexure-XI

Calculation Sheet of K9 BAT by BR Method

Name of the PSK : **No./Name of the PSK Handler/Owner**

Table 21

Behaviour Ratings under different Sub-tests Before and After Component Loadings on Five Principal Components

Sub-test	Behaviour Rating	BR Score Before CL	BR Score After Component Loading (CL) on 05 Principal Components (BR x Component Loading)				
			Confidence	Physical engagement	Social engagement	Aggression	Environmental sureness
Affability & Handling	Affability						
	Handling						
Leash	Leash						
Tug-of-war	Tug-of-war						
Retrieving	Chasing						
	Interest in object						
Dark room	Reaction in dark room						
Metal stair	Metal stair						
Unstable table	Reaction on table						
	Object						
Acoustic startle	Flight distance						
	Secondary response						
	Lasting effect						
Visual startle	Flight distance						
	Aggression						
	Secondary response						
	Lasting effect						
Gradual visual startle	Fearfulness						
	Aggression						
	Secondary response						
	Lasting effect						
Search	Intensity						
	Persistence						
Gunfire	Fearfulness						
	Curiosity						
TOTAL SCORE							
Maximum Score							
In Percentage (%) Terms							
GRADING REMARKS							
FITNESS FOR PURPOSE							

Annexure-XII

Calculation Sheet of K9 BAT by SR Method

Name of the PSK : **No./Name of the PSK Handler/Owner**

Table 22
Subjective Ratings under different Sub-tests Before and After Component Loadings on Three Principal Components

SRs	SR Score Before CL	SR Score After Component Loading (CL) on 03 Principal Components (SR x CL)		
		Engagement	Confidence	Aggression
Affability				
Competitiveness				
Hunting drive				
Environmental sureness				
Courage				
Nerve stability				
Hardness				
Liveliness				
Sharpness				
Defense drive				
Cooperation				
Prey drive				
Curiosity				
TOTAL SCORE				
Maximum Score				
In Percentage (%) Terms				
Grading Remarks				
Fitness for Purpose				