



*The World's Finest Scent Training Aids for Detector-K9 & Machines*

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Fellow Scientists and Members of The Detector K-9 Community,

**Re: TSWG T-3388: Research and Evaluation of Pseudo-Explosive Training Aids**

*"Our lives begin to end the day we become silent about things that matter"*

- Martin Luther King Jr.

This commentary is written in response to the report submitted by Dr. John V. Goodpaster to the Technical Support Working Group (TSWG), entitled *TSWG T-3388: Research and Evaluation of Pseudo-Explosive Training Aids* (and excerpts of which were also presented at the 2014 meeting of The American Academy of Forensic Sciences), in which a group of canines imprinted on Trinitrotoluene (TNT), Composition C-4, and Single-Base Smokeless Powder (SP) – explosives which are a part of the DoD Scent Kit used in training explosive-detecting dogs (EDD's) - were compared against two other groups of canines imprinted on two chemically-formulated pseudoscent variants of these explosives. One variant was the Controlled Odor Permeation System (COMPS) training aids produced by Professor Ken Furton of Florida International University, and the other variant were the TNT, RDX and SP ScentKits manufactured by ScentLogix™.

The overall approach of this study was to imprint/train the first group of canines on real explosives but not imprint/train them on either the corresponding COMPS or ScentLogix training aids. The second group of canines was imprinted/trained on the COMPS training aids, but they were not imprinted/trained on either the real explosives or the ScentLogix aids. Finally, the third group of canines was imprint/trained on the ScentLogix™ training aids, but they were not imprint/trained on either the real explosives or the COMPS training aids.

The authors concluded that, based on the results of their study, dogs imprinted/trained on pseudo materials will generally underperform when faced with real explosives, and, they therefore do not recommend the use of any of these products (COMPS or ScentLogix™) for the training of explosives detection K-9s. Based on our knowledge of the ramifications of this study to perceptions of explosives detection teams doctrines worldwide, ScentLogix™ has determined that this report, and the subsequent



follow-up scientific paper published by William Kantz, Dr Goodpaster and other members of his research group (see *Forensic Science International* **236** [2014] 157–163), deserves to be commented upon.

## I First Impressions

A first impression of the report was that the authors did not consider the complexity of using detection canines within a study when they selected their experimental design, they did not follow detection canine testing best practices in the course of performing experiments leading to the report, and provided insufficient baseline data and insufficient controls to allow the generation of meaningful conclusions. For example, they used a scientifically-debatable odor recognition test to certify K-9 proficiencies, no search-and-detect exercises were performed within the study, and there were no contributions from the trainers and handlers that were involved in the study, within the report or the subsequently published scientific paper. As a consequence, the ways in which the authors then understood and interpreted the data acquired, which translates to an understanding of the subject matter, was also mottled and flawed.

After a little reflection however, it was easy to think of a reason why. Traditionally, the research and development of scents is a domain of the perfume and fragrance industry - an industry with products made and marketed for consumerist purposes rather than to have a scent-detection purpose geared towards the military-market or law enforcement industry. Their scientific, intellectual, and product application goals are different (their emphasis is on “when-smelling-good-is-at-stake” perfumes and air fresheners for groups of human consumers - teens, grandparents, girlfriends, bosses, birthday celebrants, valentines) from those who manufacture odors for scent detection (their emphasis is on “when-lives-are-at-stake” scents or scent combinations for the detection of specific objects - explosives, narcotics, cadaver, drowned victims). One industry needs the qualitative ability of the human nose to make its decisions, the other uses the quantitative abilities of a dogs nose to make theirs. And although these perfume industries have successful traditions and infrastructures in place (such as a huge odor database) that works well for them in maintaining their profits margins and capabilities, and in satisfying their customers’ needs, we within the K-9 world are just starting to find a scientific basis to our art, and have a long way to go in subjecting scent-training aids to experimental scenarios that will generate realistic results of operational value. It is therefore understandable that the authors’ experimental design was wanting, due to the lack of already-available operations-tested



experimental scenarios to integrate within their design, especially when not collaborating with experienced K9 handlers and trainers in making design determinations.

Another first impression was the disappointing feeling that grows in one's mind as one reads the report, there might be the something "fishy" underlying the real purpose of this report. The statement on page 21 of the report, that only 1 in 20 dogs trained on genuine C4 alerted on ScentLogix™, and 0 out of 24 dogs trained on ScentLogix™ alerted on genuine C4, is an unrealistic, unheard-of statistic and everyone that uses ScentLogix™ can attest to that! This has brought queries from our user community, with some of them wondering, *"was the report deliberately sponsored or doctored to produce the results that were published in these studies?" "was it deliberately put together to misinform the DoD" "Could these studies be an attempt to portray some products as being more favorable than others and serves no other purpose than as justification for some future selection/deselection purpose?"* This assumption is given further credence from the comments of some of the participants of the study, - staff at the kennels where the research was reportedly performed - who were shocked when told of the findings of the report, and commented that the tests results were not the way it was documented and that the ScentLogix™ products did a lot better than what was stated in the report! So what is going on?

ScentLogix™ feels committed to its clients, the detector K-9 community, and will not be a silent onlooker to a situation where community who needs all the scientific knowledge it can acquire in a subject area, is provided with information that, through the sheer academic clout of the authors and seemingly endorsed by a government body (directly or indirectly), contains conclusions that lack scientific merit and enough errors to provide judgments that are ultimately inaccurate, grossly misleading, and as such, represents a potential source of dangerous misinformation that can be taken as gospel by those decision makers (and members of the community) who unquestionably believe in scientists, and who will thereafter use such information to formulate and dictate new policies within their national working dog programs.

## II. Outcome Anticipation and True Scientific Enquiry.

As a subject matter expert within a scientifically-active research, development, and commercialization (RDC) company comprising over 60 combined years of cross-disciplinary research experience in science and technology, 10 years experience in the successful development of high-performance scent-training aids, and over 30 years of detector K9 experience within its staff, this narrative is not to lampoon or



rebuff of the work of the scientists that undertook the study, but rather, a review of their efforts which, conclusively, still did not address the question, which was really why these pseudoscents work, and not if they worked or not. The “why” had to come before the “if”. Those that sponsored the study knew they worked (everyone that uses them well will see they work; also, TSWG isn’t stupid!) they simply wanted to know what made them work, and if they could make them better. In our view, this study actually failed, scientifically, even before it started, due to the fascinating way that an “Outcome-Anticipation-Outcome factor” within the minds of the scientists infected and thereafter, subconsciously controlled, the way data for this study was (i) collected, (ii) discussed, and subsequently, (iii) interpreted. Outcome-Anticipation-Outcome is our “*ScentBonics*” definition of a condition, also widespread within the detector K-9 community, whereby a scientist, master trainer, program manager, etc, is so convinced that they already know what the outcome of a study would be (because they have so many years of experience in the field that the answer is “undoubtedly obvious” to them), that any undertaken study becomes a (subconscious) effort to scientifically validate their anticipations and presumptions. The anticipation in this case, is that the study will end up being a validation of the premise that “*there is nothing better than using real explosives as the scent training aids for training explosives detection dogs to detect explosives,*” so any subsequent research simply surmounts to looking for pieces of information to validate this premise.

The authors subconsciously displayed this phenomenon of OAO many times within the report, stating, for example, in page 26, that, “*If the mimic is accurate, one would expect it to consistently fool canines trained on the real version of the explosive in question.*” In the results and discussion section on page 20, it was also stated that “*the results of dogs certified to be proficient at identifying their own training aids...are indicated in red.*” This is followed by: “*It is the responses that fall outside of this area that may reflect the extent to which real and pseudo-explosives are confused by the canines ...and these are indicated in yellow.*” “Fool?” Confused? It seems that the authors believe that a K9 trained on real is in a state of confusion if it alerts on a pseudo, and the same applies to a K9 trained on pseudo, if it alerts on real. We are still in the process of science philosophy and enquiry in this field of scent detection. How can real scientific enquiry be accomplished if the scientists undertaking the study display an underlying believe, before acquiring data, that the odor between a real material and its pseudoscent mimic cannot, and should not, be perceived as being equivalent and indistinguishable to a K9, by a K-9? So will this presumption now subconsciously limit the number of dogs trained on real explosives that these scientists will be actually allow to be “fooled” or “confused” by these pseudoscents? Will this



affect the way that they interpret the data (since the trainers and handlers have no explanation why the K9s are indiscriminately hitting, and they, the scientists do have a reason for why they should not?) Imagine our nation's first line of defense being dependent on teams whose success is based on how well they are confused.

But then, this is the same general thought embraced by most trainers and handlers within the detector K-9 community. You hear rampant comments like *"you have to train on real to find real"* or *"you have to train on street finds to find street finds"* or *"what would I say in court if my K9 alerts on pseudo?"* And then you go on to scrutinize a K-9 trained on pseudo a lot harder than a K-9 that trained on real, and commit a little OAO in the process. Well, times, knowledge, and perceptions have changed and science is getting involved in improving the detection process. It's not about what you are using to train; it is about how good it is, how well it makes you pass certification, how well it works for you in finding the guns, bombs, drugs, the bad guys, and saving your life and the lives of your colleagues and all good people out there. Can you find 328,000 pounds of Semtex? How about 2500 Kg of AN on a truck? Or 1/8 pound of C4 in that IED/HME buried 2 feet in the ground? Or of marijuana hidden in a mason jar in a car? Or used heroin needles stuck inside a closed Febreze bottle? Or \$30,000 just handled by a drug dealer? With our present day knowledge and technology in scent detection, an ideal scent training aid should make all this possible, and it should not matter if it is "real" or a chemically formulated pseudoscent. Rather, it should be an ideal training aid! We all know the importance of real explosives and narcotics in training, and their unconditional use for certifications. However, we all also know their operational limitations. A lot of senior members within the community find it hard to believe that scents can now be engineering with traits to make them "ideal" training aids, i.e., training aids that provide performances better than using real, in finding real. This is the reality of the future, your occupational future, and you better learn to accept it to be part of the emergent generation of handlers and trainers.

### III. Pseudo: A Nomenclature Based on a Misrepresentation of Facts

One of the main triggers of OAO within the detector K9 community is the word "pseudo". There is a literary difference between the words "pseudo" and "pseudoscent" that seems to be lost within the logical thinking perspective of some so-called "senior members" of the detector K9 community who normally disseminate inaccurate advise to young, enthusiastic, information-seeking members of the detector K-9 community via blogs, seminars and on sites such as Facebook and LinkedIn, through



confusing the true meaning of “pseudo” which means “so fake”, with the meaning of “pseudoscent” which means “so similar,” “so indistinguishable from real,” “a replica of real”. Although one word seems like the extension of another, they are, in fact, opposite in definition. One word has a Latin origin while the other has Greek origins. A pseudoscent of a material is a scent that smells so much like the material it is supposed to mimic, that they are indistinguishable from one another in scent, using the sense of smell. Yes, “pseudo” means “fake”, but, “pseudoscent” means “like real”. And by plain definition, a K-9 is not supposed to confuse a true material with its pseudoscent equivalent, there simply is not supposed to be any difference in smell; period. This is something the community at large has not understood, and why they too, like the non-specialist academics that get monetary opportunities to do short-term work in the field of scent detection, do not expect anything great to come out of using a pseudoscent. A true scent simulant should replicate the parent odor in ways that a Picasso can be duplicated for the eyes to think they are one and the same as the original, and the music of *The Grateful Dead* can be duplicated for the ears in a way that, if you closed your eyes, you’ll think you have the band playing the music right in front of you. This is the science that we perform at ScentLogix™. The lack of anticipation of this possibility by the authors’ skews their results in the first case.

So what, really, can then be classified as a pseudo? So let’s clarify some thoughts...all inert explosive training aids such as COMPS, SOKKS™, ScentLogix™, NESTT™ and TrueScent™ have either been made with no intention of exploding (e.g., ScentLogix™) or have been rendered non-explosive by mixing real explosives with an inert material such as sand and silica (e.g., NESTT™, TrueScent™). An explosive that has been rendered non explosive through dilution with a non-explosive material (e.g., silica) to form a mixture of less than 10% of explosive content, such as NESTT™ or True Scent™, cannot be called an explosive any longer because it would not detonate. If they cannot explode, nor can they be made to explode, then they are not explosives, and therefore are not real. Neither are they pseudoexplosives – since they are not manufactured to mimic the explosives capability of the original material. Rather, they are made to mimic the odor. So what they truly are, are pseudoscents.

And, if a mixture contains only 10% real explosives, why is the odor expected to be the same as a 100% real explosive? How about the odor contribution of the non-explosive diluents within the mixture, which constitutes 90%, and which translates to a possibility that 90% of the scent signature will, at any time, be the odor of diluents? So again, when looked from this angle, the odors of these mixtures are pseudoscents-gone-wrong since a major component of scent composition comes from the diluents used



in their mixing to become regulated as safe. If the odors of non-explosive mimics made by the simple dilution of explosive materials in an inert material, as represented by NESTT™ and TrueScent™, are so similar to the odors of the real explosives that they mimic, then why do the companies that manufacture such mimics, as K9s worldwide have indicated, need to provide a “distractor odor” for proving K9s trained on these mimics off their 90% background odor? If it is that “real”, why do you need a blank? And to the members of the community that like to explain animal behavior in anthropomorphic terms (please Google this word), isn't your K-9 trying to tell you something by needing a distractor odor?

The bottom line is when you try not to make it explode while trying to keep its scent, what you are trying to make is a pseudoscent of an explosive not a pseudoexplosive, because it is not the explosive character that is being preserved. And there seems to be a disconnection between the trainers/handlers and understanding the scientific underpinnings of their duties when there is an insistence for scent-training aids to be selected on how close they relate to the word “explosive”, while their K9s partners that really need aids based on their “odor” properties. It's the odor that matters! However, not all odors are the same. The difference is the real science.

#### IV. The NORT Method – A Knowledge-based time For Change

It was stated on page 17 of the report that the National Odor Recognition Test (NORT) was used for the study. NORT is a national proficiency test typically administered by the Bureau of Alcohol, Tobacco, and Firearms (ATF), and was the preferred test method, probably due to the lead author's prior experience as an ATF chemist. It is true that this NORT is considered a gold-standard amongst a lot of Federal agencies. While traditionally accepted, ScentLogix believes that the NORT does not test the true operational capability of a K-9, especially not a K9 within a DoS, DHS, or Military Working Dog program (towards which this study was primarily meant for). From our research understanding, the odor generated from the setup of a NORT tin does not truly represent the odor of an explosive; instead, it replicates the odor of a mine. This is due to a very simple reason – metals react with gases to form new products. Metals have been known for ages to be catalysts for gaseous reactions, where they change gases one type to another. Within ScentLogix, we use metals such as nickel, platinum, tin and zinc to form new odors or change existing ones. This is the phenomena exploited in catalytic converters where the emission odors of a vehicle are converted to legal regulated limits by passing them through a bed of finely-divided metal particles.



When a material (such as an explosive) is placed within a metal encasement, the odors within the scent signature of the material will react with the metal's surface (which is a good electron donor) to form new odors, thereby adding new odor components to its scent signature. Sometimes, the level of such new odors changes the native scent signature of the material (explosive) to the extent that highly-discriminatory dogs start to simply show a strong interest (and looking for handler cues) towards the material in the tin, or start to walk it. And that, contrary to belief, is a good dog! It is for the same reason that you cannot simply start using an explosives detection dog as a mine detection dog. It will initially walk mines. Thus, the NORT is a good way to start off dogs in a mine detection program, but not in explosives detection.

Hopefully, with this scientific explanation, it's now easier for those that take the NORT to understand why it seems they have to train for the NORT the NORT way, to pass the NORT. Does "metal" not have a smell? Some humans call it "metallic" odor. And as for prior explanations by idolized trainers as to why the NORT test is as "difficult to pass" as it is ...well the less science there is to provide an explanation, the louder and more entrenched the opinions of the uninformed "international K-9" trainer-mentor who "knows everything" simply by having 30 years experience on the job becomes. A plumber does not know the chemical formulae of water simply by spending 26 years at the job. All being said, and contrary to the results obtained by the authors of this study, those that use ScentLogix™ will tell you that they do not need to subject their K9's to any special training procedures to pass the NORT because, funnily enough, it seems to be the best aid to use to train for a NORT as their K-9s now seem to know what they are looking for so well that they now know it is coming out of (and reacting with) a tin. They are more concerned with expanding their training and making their scent-detection scenarios harder for their dogs to increase their detection efficiency.

V. And Thou Shall Knoweth Thy Training Aid

Somewhere within the report, it was stated that 20 grams of each of the materials was used, and that the containers were placed to sit there (stewing) for 30 minutes prior to testing. Well, each ScentLogix™ aid weighs 35 grams or more, so it is impossible to use 20 grams of the material except if the cotton pouch was ruptured, the material was scooped out and the scent signature invalidated – and it is better not to think of this as being the case. So, the only other main area of mention would involve the set time. A 30 minute set time might be normal for real explosives, but not for ScentLogix™, because by this time (30mins), the odor generated by a ScentLogix™ training aid will be representative of a large amount



of explosives, and beyond the detection limits of a new inexperienced K9 recently imprinted on small amounts (less than 6 lb) of real explosives over a 3-month period. And if it took 30 minutes before testing the first dog, how long later was the last dog tested? The last dog probably did not know what was going on during that search-and-detect session because it is looking for what it has not been trained to find, what it cannot see with its nose, – large hides! The scientists, as one of their first acts of true scientific enquiry, should have contacted ScentLogix™ to learn about the product and how best to use it, rather than assume that it can be used using the same methods and conditions as real explosives. They never did contact the manufacturers at any time during their studies, and the scientific error caused by this act is a crucial one since their dogs have not been trained long enough on real to enable them detect a ScentLogix™ training aid after a  $\geq 30$  minute set time. What they were testing for at this stage, was the ability of the dog trained on small hides, to detect large hides.

This error has highlighted a need for ScentLogix™ also, to, at least, provide training manuals that reflect how best to use their training aids, rather than to assume that trainers and can use these products the same way as they use real - using any of their own diverse training regimens (and remember, the only thing two trainers easily agree about is what a third trainer is doing wrong so one can imagine how many training regimens are out there!). We are now in the process of publishing such a trainers' manual to rectify this oversight.

#### VI. A Case of Incomplete Training?

Some statements within this study pointed at the possibility that a hastened, incomplete scent-training of the K9's had taken place. For example, the 1<sup>st</sup> statement on the last paragraph of page 23, *"...However, there were exceptions. For example, there was one canine that was imprinted on COMPS TNT mimic and reliably responded to genuine TNT"* and, *"One canine that was imprinted on ScentLogix™ pseudo-smokeless powder, responded perfectly to genuine smokeless powder"* strongly suggests that the training was incomplete. If one K9 imprinted on ScentLogix™ SP has 100% accuracy with real SP and then similarly imprinted K9s miss the same real SP, it shows that the dogs were at different levels of understanding odor, as proficiency in understanding cannot be expected to be to the same degree, just like kids in the same class in school are all not at the same level of understanding. Again, the chart on page 24 shows that 50% of the dogs trained on ScentLogix™ had 0% accuracy while the other 50% had accuracies of 50% and above, with one K9 having a 100% accuracy. If you have 6 K9s of equal caliber and you train all of them on a pseudo, and 2 of these K9s consistently and reliably alert on real materials



while the other four K9s do not, then you cannot automatically blame the inability of the other K9s to perform the same feat, on the pseudo. Rather, look at the breath, depth and scope of your training program and identify those important training elements that you are not implementing to effect success of the other dogs achieving the same feat – such as increasing the time span of green-dog training! It's also wondered if more than one trainer was used during this training exercise, because all dogs will have to be trained by the same trainer for there to be accurate comparisons of K9 proficiency. And if a single trainer was used, did the trainer confirm training the variety of K9s selected for the study, with their different behavioral traits, to the same levels of competence? (at least we know that this did not happen with TNT, as can be read on the next page). The real presented fact made by this statement, that some of the K9s imprinted on the pseudos alerted on real, and at 100% efficiency, justifies the worthiness of the pseudos, and raises questions of why the other K9s did not respond more than anything else.

Another aspect pointing to possible incomplete training is in another statement in which the authors said, *"After suitable training, all of the canines (18 split into three equal groups) passed the testing criterion where they identified the target odors on which they had been imprinted at least once after two passes through an array of unmarked containers... The only odor that was not detected with 100% reliability was the ScentLogix™ pseudo-TNT product, which showed inconsistent results throughout the training of the ScentLogix™ group."* The question is, why would a K9 not alert on an odor it had been imprinted on? Because it had not been imprinted well enough? (duh) And, if the K9 had not been trained to any degree of reliability on TNT, why then subject the K-9 to tests involving TNT anyway, only to fail them and publish the data with fanfare? A case of incomplete training?, OAO?, a doctored document?, or are the K9s truly "untrainable" on TNT?

Also, why did the authors not relate this data to the data they actually did obtain from another study, performed by the same authors, which showed certified government K9s trained on real TNT having difficulty with detecting real TNT, to the extent that the K9s in question alerted more on the 2,4 DNT pseudoscent than on TNT itself, and on NEST TNT than real TNT. Even the authors were so surprised at this fact that they gave it a honorable mention. Now, why was this past experience hidden, and not used to explain the anomaly found with new data pertaining to the K9s ability to detect ScentLogix™ TNT in particular? "Scientific forgetfulness," or plain dodgy stuff?



VII. Other Concerns About the Study:

Apart from these facts above, here are other concerns that question the scientific plausibility of the TSWG-sponsored study:

- Too much emphasis on comparing the analytical data (FTIR, GC/MS) between pseudo and pseudo. There was no analytical data presented on any of the real explosives, and no comparison between the pseudo and real explosives was done.
- The ages and weights of the “real” explosives used for the study were not documented. This is important to state this in a study of this nature, as it could throw a lot of light on the data obtained. Its absence makes the data less useful.
- The imprinting method was not documented. Neither was the reinforcement training method. It’s like they’ve been deemed “not important” enough to warrant being documented in this report. Do they know the importance of such training records to the community? Imprinting is the foundational training of a scent detection dog, and the success of a dog depends on his understanding of imprinting and the application of this knowledge to finding the imprint target. The conclusions drawn in the paper seem to be made solely by a group of scientists and their team of undergraduate/graduate students, none of whom are K-9 trainers/handlers, nor did they have the involvement of trainers/handlers (if there were any, they were not mentioned or acknowledged within the report). A study of such importance to the community should involve contributions from the trainers, handlers and scientists – as authors - with the combination of their ideas reflected within the report narrative. The absence of such information makes the paper feel like it was written mainly as an academic digest and not for the operational community. During its own studies, ScentLogix™ uses an ethological approach to studying K9 behavior with emphasis on combining observation with experiment. We are applied scientists, and have found out from experience that this works best. It is important for scientists to, at least, be able to distinguish the difference between when a K9 does not know odor to when the K9 is having a bad day! You cannot make this call better than a seasoned K9 trainer or handler team. Okay yes, this is one of the many reasons why we at ScentLogix™ hang out with trainers and handlers, because we learn a lot of stuff from them, but it is also one of the reasons we



have learnt to interpret data better (as can be judged from the scope and quality of our products).

- It would also been better to have used more than one kennel, so that more diverse results could be obtained and compared. It was our previous understanding that more than one kennel was being used for the study; however, the results only reflected the participation of one kennel. Did the scientists consider the data obtained from the other kennels so “against the norm” that they were excluded from the study?
- The table on page 7 portrays a misconception that “pseudos” do not have as much a variety of explosive odors as can be found within the DoD ScentKit. A phone call to the manufacturers would have lead to an understanding that ScentLogix™ produces the world’s most comprehensive range of scent detection training aids for explosives detection, with a variety of explosives aids and aid combinations that far outmatches the explosives types and detection range a K9 can be taught using the DoD ScentKit.
- A comment on Page 13 reveals that the COMP TNT mimic was actually real single-base SP. Why did scientists make such a decision to engage in such an action as to accept SP as TNT, and then make a big deal out of any data obtained? And, in an act of obvious science, why weren’t the K9s trained on real SP used to search for the COMP TNT, since the COMP TNT was actually SP? Or, was COMP set up for failure? One of the COMP TNT K9’s also did actually detect TNT, even though it was trained on SP; why? Was this considered science worth investigating?
- The comment that *“0/6 dogs trained on real C4 (of an undetermined age) alerted on ScentLogix™”* is just not consistent with what any ScentLogix™ user will tell you. Worldwide, and barring handler errors, every single K-9 well-imprinted on ScentLogix™ has passed certification on first try, every single DoD K-9 we have ever tested has alerted on ScentLogix’s C4, and we have the K9 validity test sheets to prove it! Our personal scientific conclusions on why the authors had the results they did points to either of 2 reasons; (i) the K9s imprinted on C4 did not completely know C4 odor (incomplete training), or, more likely, (ii) K9s trained on small amounts of C4 explosive were exposed to ScentLogix™ that had been sitting (stewing) all day. Exposure to ScentLogix™ sitting for over 100 minutes = exposure to the scent equivalence of >100 lbs of explosive. Were their K-9s adequately pre-trained to detect such large amounts by



sticking their nose in a tin? How about the other side of the coin, what were the opinions of the trainers and handlers involved in this study? Did they think that the experimental procedures being dictated by the scientists had merit? Is politics (or simply, bad perception) being mixed with science to produce dicey results?

VIII. "On the Smell of Composition C4" – A Comparative Narrative

The paper published in *Forensic Science International*, **236**, 157–163 (2014) by the same authors, where the data on C4 was made the singular subject of study, does not address the use of ScentLogix™ or COMPS, but rather, pertains to a comparison of the activities of 33 police K-9s, based in MD, towards C4 and to some chemicals identified as being part of its scent signature. Ironically, we have performed a more extensive version of this study 10 years ago, using six different kennels (inc. Southern Coast K9, FL; Ventosa Kennels, NC; Banner Healthcare System, AZ; Sun State K9, FL), in conjunction with over 20 MWD's from Lackland AFB, TX, and from 6 police departments (you need a diversity of data sources!). To us, it is obvious that very old C4 was used for this study. Although the age of the C4 used was, again, not stated, the fact that the chromatograms in Fig 3 did not show the presence of the other anticipated odor makers that are characteristic of fresh C4, such as cyclohexanone, and evidence of low levels of 2-ethyl-1-hexanol in comparison to DMDB, confirms this fact. Our studies have shown that a K9 trained on new C4 will alert on old C4 but a (good) K9 trained on old C4 may not alert on fresh C4. If the K9s used in the TSWG study were trained with the same type of old C4, such K9s might walk the odor of fresh C4 as represented by ScentLogix™ RDX.

As previously mentioned for the TSWG report, the authors' lack of true collaboration with experienced members of the detector K9 community was again apparent within the experimental design of this paper. For example, it was stated that K9s within the study were also "*tested on their ability to detect a list of distractor materials such as PVC pipe, PVC tiles, credit cards, Ziploc food bags, a shower curtain and a Wal-Mart shipping bag*". Of course the K9s did not alert on these materials, and any good trainer or experienced handler could have predicted that. However, in a display of outcome-anticipation-outcome (phew! we are in need of a better word for this phenomenon), the authors comments were "*appropriately, dogs that are trained to find real explosives are (only) going to find real explosives and not much else.*" In actuality, efforts should have been directed towards using those materials that explosive-detector K9s are known to false-alert on, as distractors. Such materials include, in our experience, movie film reels, VCR's tapes, toners, table tennis balls and others that will not be



mentioned for security purposes. Obviously, no consultation with experienced people within the detector K9 community was done before this research was performed, or they would have known this fact.

Finally, it was stated that only 67% the 33 certified K9s used in this study (which has a larger data set, a preferred approach), alerted on C4 during the performance of NORT during this study. This further confirms our assertions that the NORT is far from being an ideal odor recognition test for explosives detection dogs, on the basis of the reactions between gases and metals, and, as mentioned previously, even lower rates would be achieved if TNT was used for the NORT of non-NORT-trained dogs (surely, seasoned trainers know this). It is strongly suggested that a more interesting study that involves an assessment of the NORT as being a reliable test for explosives detection K9s be undertaken, as it is purported not to serve the purpose it was intended for. At its current format, NORT best serves as the foundation of a good odor recognition test platform for mine detection dogs, and we will be happy and honored to assist the ATF in activities resulting in the establishment of better NORT protocols for explosive detection dogs.

IX. The Question of “Why Are There Too Many Why’s?”

Although anticipated to be an investigative attempt to decipher the enigma of odor and to thereafter apply this understanding towards proposing the fabrication of more-effective pseudoscents (and, thereafter, in the design of effective scent-detection training programs), this study did not cover the detail we anticipated. Unfortunately, the tests and test-results were experimentally flawed and a lot of pre-thoughts had been assumed even before the experimental process actually commenced. Is this simply bad science, or was the study biased and “programmed to fail” in the first case? There are simply too many whys...? Why are the trainers and handlers involved in the study claiming that the results published were not the same as the results they would have had from the same procedure they witnessed? Why was Auburn, the recognized center of excellence for detector K9 studies, not given the task of dealing with the study? Why was an academic institution with no experience in doing such studies given the study, when a reputable kennel (like the one that was eventually used in the study as a subcontractor) or two, could have done better, since it only pertained to the evaluation of pre-existing aids (an applied science) and does not require the syntheses of new ones (an academic science)? Why do the results of this study turn out to be the opposite of more extensive studies done by authentic and experienced K9 trainers within the community such as Kevin Sheldahl (as in



<http://leerburg.com/scentlogix.htm>), Nate Harves (as in <http://sportwaffenk9.com/policek9.narcpseudo.shtml>), or, the US Customs, who have been using pseudoscents, with great success, for over 20 years?

One wonders, that if this study was supposed to involve all available non-hazardous training aids, why were other products such as NESTT™ and True Scent™ not involved in this study? Since the authors stated that *no pseudo can match a real material as a training aid*, can we safely assume that True Scent™, for example, would have also failed the test if subjected to the same experimental conditions as used in the report? Or, to the contrary, could the author's choice of evaluated aids be due to a flaw in operational K9 terminology leading to the misconception that there is a difference between the classifications "pseudoscent" and "scent-simulant" ...and that aids typically labeled "simulants" are beyond scientific scrutiny or reproach since they are truly considered "real"? If so, can anyone explain why only just a little over half of the 33 dogs involved in the study responded to NESTT™, which, like True Scent™, is designed to simulate RDX-based explosives using the same principles of using "real" (from our scientific standpoint, there is practically no difference between the two products, except that you get more product and no plastic with NESTT™)?

On the strength of these whys?, its plausible to reason and wonder if the study was made to fail - if the study was simply to generate an "official report" that can make the DoD/DHS/LEO community (i) stop using ScentLogix™ or COMPS altogether, or (ii) make them choose another product in preference to the two evaluated mimics? It makes no sense for a study of this expense and magnitude not to involve data from companies from which the government actually procures the majority of their inert training aids, and upon which our NORT is developed. This exclusion itself constitutes incomplete science, an incomplete service to TSWG, to the DoD, the ATF and to the K9 community at large.

X. ScentLogix™ – A Small Business Doing the Impossible

The objective of the TSWG-sponsored study was to evaluate possibilities for the development of new canine training aids which mimic the scent of an explosive while containing inert ingredients. Yet, after an overall expenditure of over \$600K, the scientists on the study huffed, puffed, and finally concluded that it was impossible to create such scent mimics, and that there is no better scent training aid for the detection of a material than the material itself. It is saddening that such monies are not granted to the small businesses that are actually at the forefront of such science, such as ScentLogix™, to help extend



their research and development capabilities. With such money, ScentLogix™ could have made a cadaver aid and more products geared to save more lives!

Then ...why fret? For what is concluded as being impossible by the authors is what ScentLogix™ is successfully proving as being possible. Dr. Futons' reaction to this TSWG report is unknown, but we stand by our claims about our product. The ScentLogix™ Detection KitSets are the World's Most Comprehensive K-9 Training Scent Kits for the Detection of Chemical Explosives, Mines, Weapons & Ammunition, IED's, HME's, Narcotics and Laundered Currency. It is an operations-proven product specially configured for elite K-9 teams who demand the best from their detector K-9s when deployed to theatres where realistic threats of exposure to diverse types of these materials are possible. The unique scent-engineering; packaging; product lifespan; ease of transport, storage and use; and proven operational effectiveness of these non-hazardous KitSets within multiple theaters, makes them superior to all other forms of K-9 ScentKits available; period. And there are loads of DoD and LEO canine validity test datasheets and testimonials to prove this.

For ScentLogix™, us "*finding real*" is the mission; and developing the scent education tools needed to make this happen is the science. Yes, ScentLogix's approach is different from the theoretical and rote approaches of our competitors. We apply our theories, education and technological know-how towards the production of next generation, science inspired, and performance enhancing ScentKits for the next generation trainer, handler and K-9. Look at the record of ScentLogix™ within the detector K9 community and the testaments of our users. A K-9 that knows odor will not miss (walk) a ScentLogix™ aid; every canine imprinted on the product, worldwide, has passed their certifications on their first try; users claim that their K-9s have less false alerts (if any at all) than if they used real explosives/narcotics to imprint their K-9s; canines that are trained on our Smokeless Powder aid alert on all brands of Smokeless Powder (even a K9 did so in this study but the ramifications of this event went unnoticed); our Marijuana training aid is proven by users to be a better training aid than real Marijuana, as K-9s trained on ScentLogix™ marijuana will also alert on cannabis resin, hashish and Spice/K2; the ScentLogix™ explosive product range is a great operations-proven companion training aid for the Vapor Wake™ and similar upcoming crosscutting detection training programs; and K9s trained on our products are winning detection competitions worldwide, from the US (USPCA, WDDO, The Vohne Liche K9 Olympics) to Indonesia, from Mexico to Russia. ScentLogix™-imprinted K9s have been certified through all known certification standards worldwide, without a single failure.



Finally, we have never had a user customer say anything bad about the performance of ScentLogix™, and you cannot say that about real. That, in itself makes us proud of our service, and makes us feel better than real.

### Concluding Remarks

This study serves as a lesson to scientists and trainers about the errors that can arise from embarking in “seemingly straightforward” K9 studies. True solutions to challenges within the industry require the convergence of ideas from multiple disciplines and multiple perspectives. In fact, it takes a combination of behavioral scientists; analytical, physical and organic chemists; physicists, olfaction scientists; scent manufacturers; K9 trainers and handlers and carefully-selected K9s to perform a diversi-convergent phenomenon-searching study in training aids and scent detection. Whatever your individual subject of expertise - trainer, handler, scientist, tracker, imprinter - you cannot do it by yourself. This concept of “seamless togetherness” has been practiced by other industries that had a need to understand odor to optimize efficacy and value, to great success. For example, odor is now being used in animal husbandry to increase the amount of cattle borne through artificial insemination. They believed in the idea, invested in it to the scope of their operational needs, all worked together to have an underlying foundation of true knowledge, applied the science and the lessons learned towards grave needs, and now it is working for them.

And finally, the most thought-provoking question is why do the trainers and handlers at the reputable kennels involved in the study, claim that the study did not go as stated by the scientists, and that the study involving ScentLogix™ went so well that they themselves have now incorporated the use of ScentLogix within components of their own training regimen? Why are conclusions drawn from this study are simply so skewed and off-mark that it makes you think there is/was/might-be an ulterior reason for the study?; is this simply the identified lack of communication between scientists and trainers/handlers that have led to a bad interpretation of the handlers/trainers data, or, is it, truly, as it seems, a report deliberately doctored to deceive TSWG, the DoD and the community, giving other (competitor) products the benefit of government selection and use?

It is a professional opinion that the data collected from these 18 freshly trained detection teams cannot be deemed as representative of the thousands of deployed teams across the world since (i) studies of this nature must include a diverse population of detection teams before any plausible generalizations



can be made; (ii) the experimental design did not embrace the complexity of using detection canines in a scientific study relating to olfaction; (iii) the study did not combine observation with experiment to draw more realistic conclusions (iv) no other study has had the same outcome as the study presented by these authors, (v) there are conflicting stories as to the true outcome of this results. At best, the results are those expressed by the scientists, and not the trainers and handlers from where the studies were performed. Maybe the scientists did what scientists do best - completely disregard the knowledge and applicable-understanding inherent within an operational working dog training facility, refuse to understand their choice of certification parameters and standards, and, in essence, utilize some sterile-environment considerations in their decision making process that now constitutes the basis of a report meant for theater-active environments.

However, from the TSWG interest, the generated report, other available publications - including this commentary – one thing is clear ...whether they are called pseudoscents or pseudos; simulant or *it's-not-real*, high technology is, at last, impacting the scent-detection division of the detector K9 training, and it will continue to do so. Chemically-engineered scent-training aids are a scientific fact here to stay. ScentLogix™ users are already calling “real” scent-training aids, “traditional” scent-training aids. For them, they do not need “real” to imprint a K9 to find real, and everyone should be asking why they feel this way. ScentLogix™ users truly realize that ScentLogix™ ScentKits are, truly, next-generation “parent-odor” scent-training aids truly engineered to be “better” than the “real materials” they represent. And they have been operationally proven to be so. The easiest way to know about ScentLogix™ is to ask a ScentLogix™ user. Science never lies, and, rightfully so, **K-9s, and not humans, are proving it works!**

We thank you for your time and attention, and welcome comments from scientists, and the community-at-large.

Respectfully,

David B. Adebimpe, Ph.D, D.Sc, CChem, MRSC  
Technical Lead, ScentLogix™ Brand