

The Magazine of the
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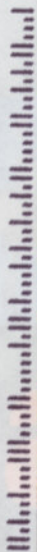


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NON-PROFIT ORG.
U.S. POSTAGE
PAID
MAIL MOVERS

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Program
to Address

Racial
Profiling

EXTRACT

PLUS

The Power of Public-Private Partnerships
The Truth and Voice Stress Analysis

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EXTRACT

The Truth & Voice Stress Analysis

The truth, the whole truth and nothing but the truth. This is our goal as investigators, to uncover the truth from our investigations and bring the perpetrator to justice. For centuries society has struggled with determining the truth from offenders. Ancient and middle age techniques involved both physical and mechanical primitive means to establish guilt or innocence. Current deception detection systems are expected by civilized society to make a legitimate attempt to be objective, and to do no lasting harm to the subject. During the 19th Century experimentation began with pulse and blood pressure changes, chemicals were also later used that was referred to as truth serum. Perspiration was found to be connected to the psychological process, and then breathing and heart rate change. These discoveries were later developed into what is now known as the polygraph.

During 1964 the Military was searching for a means to supplement the polygraph with an instrument that could be used to examine an individual that required no direct connection to the person's body, and certainly not to do him any lasting physical or psychological harm. Lt. Colonel Charles R. McQuiston, Wilson Ford and Alan Bell, retired U.S Army developed and produced an instrument later named the Psychological Stress Evaluator. This instrument was based on the measuring of the Micro-tremor of an individual's voice from the involuntary micro muscle tremor when that individual experienced stress.

Technology advancements have allowed major improvements of the Voice Stress Analysis process since the 1960's and is now available is digital computer software that is adaptable to all IBM compatible computers, allowing portability and easy user-friendly use for the investigator. The computerized digital software also allows the transmittal of pre and post exams via electronic mail like a text message. The latest generation of digital audio and numeric processing technology has revolutionized the art and science of Truth and Deception, as conducted by Voice Stress Analysis. Consequently, the benefits of non-invasive (non-contact), near-real-time-stress analysis, in person, by recordings, and by telephony, will substantially facilitate the reduction of subversive activities related to terrorism, criminal justice, fraud, counter drug trafficking, force protection, white collar crime and the like.

The Voice Stress Analyzer technology for measurement of micro-dynamics of the autonomic micro-tremor provides a highly reliable and accurate system supporting the interrogation process; generating a voice wave pattern that can be observed, quantified, and further compared with validated, standardized databases to assure highly valid conclusions of truth or deception. The system is considered universal, as it can be conducted in the language and culture of the subject.

This article addresses an emerging technology as a tool for security and law enforcement applications. Scientifically speaking, we do not refer to such systems as "lie detectors." Fundamentally, they are methodologies

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for revealing physiological indicators of differences in the stress level of the human subject. In many cases, and under carefully controlled conditions, a subject's voice wave patterns can be isolated to indicate conditions consistent with attempts to deceive, or to not deceive. These wave patterns are the result of physiological responses caused by psychological stimuli.

It must be emphasized that **the objective of VSA is to determine the Truth**. The process has cleared as many subjects as it has recommended for further investigation. For example, the priest accused of sexual abuse, a stroke victim, under anti-depressant medications – cleared. Accuser recants. VSA does see through the physiological screens of drugs and alcohol. In deceptive cases, clear and interpretable voice wave patterns are obtained.

Many applications in law enforcement and security can benefit from the availability of such an analysis system. These applications can be as mundane as an eligibility verification tool for weapon purchases or to identify persons with backgrounds, which would prohibit them from holding certain positions of Responsibility. Also, drug screening programs for high school, college, and professional sports. VSA may also be teamed with other technologies applicable to many Corrections and Probation subject management functions.

VSA can be used in the war on terrorism in sophisticated interrogations related to virtually any activity, wherein a subject wishes to attempt to conceal information or to deceive. Currently, there is an excellent example of criminal behavior that can be used to illustrate the entire range of detection of psycho-physiological stress, and the resultant interpretation. That example is, of course, international terrorism. Terrorism employs the gamut of criminal behavior– fraud, theft, money laundering, and destruction of property, kidnapping, murder, and agitation propaganda.

With the recent advances and availability of digital technology, the technique has advanced in accuracy and capability to a point where it is gaining adherents the world over. VSA is the primary means of non-invasive deception detection today. It requires no intimidating (and stress-making) harnesses or electronic sensors to be attached to the subject's body; it can be employed remotely over various audio media, and can be used to correlate a subject's past recorded statements with the present situation. Further technical enhancements are currently approaching release, and will greatly expand system applications. Now, the VSA system can be directly integrated with independent forms of deception detection and interpretation, to yield an extraordinarily capable deception analyzer.

The majority of all persons subconsciously want to respond truthfully, and when a person responds untruthfully the body reacts in a variety of ways, the pupil of the eye constricts, their breathing, pulse and heart rate change, perspiration may occur, involuntary muscle response may occur to name a

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few and of course the vocal response when untruthful generates stress causing an involuntary vocal muscle response known as a micro tremor. This vocal micro tremor is electronically detectable, but it is not audible to the human ear because the micro tremor occurs below the hearing range of human ear at 8 to 14 Hertz. The stress vocal micro tremor when detected electronically reveals a voice wave pattern in a variety of uniform patterns. The non-stress voice response is revealed in a non-uniform but erratic wave pattern.

Voice stress is unique because it is an involuntary smooth vocal muscle response and cannot be manipulated or controlled. Language is not an issue and the use of drugs and medication are not an issue. However it would be prudent not to examine a person when they are obviously under the influence to the point of physical impairment. Voice Stress examinations can be conducted live in person or from any pre recorded audible sound source, such as the media, radio, television, emergency 911 calls and pre recorded interviews and telephone calls.

Not all voice stress supports deception, but non-voice stress can support deception given the nature of the event or circumstances. An example would be if a person would be expected to show voice stress and does not, that could also support deception. For example: a person reports that his or her spouse has just been murdered via a 911 emergency telephone but does not show stress. Under these circumstances it would be reasonable to conclude that a person reporting such a traumatic event involving a loved one, would normally be expected to show signs of stress. Under this type and similar circumstances the lack of stress could also show deception. Stress of the voice alone does not always indicate deception. However when the examination is conducted in context with the inquiry, response to that inquiry and the circumstances of the event in question, stress in the voice does support deception.

METHODOLOGY OF TESTING:

How is VSA information collected and analyzed? When conducting a live in person examination there are three elements that must be present to complete a successful examination. While the fundamental techniques are invariable, the actual application will have some impact on the way those techniques are implemented. VSA depends on three inseparable elements:

- A trained Voice Stress Analysis examiner.
- Electronic Instrumentation (computer software, digital audio recorder, and computer processor).
- Constructed set of proven interview techniques and test protocols.

The examiner then prepares the test sequence. This involves several types of questions – some are **(Irrelevant questions)** like name & date

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designed to put the subject at ease. Some are **(Control questions)** like color preferences intended to establish a base line stress condition. Some are **(Irrelevant outside issue questions)**, like concerns of being asked unknown questions, and other are **(relevant questions)**, like do you know who?, to cause a specific reaction which might be useful to the analysis. Eleven to fourteen questions are used in the most popular interviews.

Questions are designed to be answered with a "yes" or "no," but the system easily accommodates any verbal response. The system requires absolutely no physical contact between equipment and the subject. This is considerably different from typical polygraph conditions, where the subject is physically connected to three or four separate sensors, in the form of belts clips, and the like. The subject is not free to move, and is often intimidated by his restrictions. The VSA laptop computer is positioned on the table so only the examiner can see the screen, and a microphone is the only other equipment in the room. The microphone is usually placed on a pad to isolate it from noises conducted through the table surface, and is not touched by either participant. This comfortable freedom of movement by the subject may leave him free to communicate to other evaluation systems via "body language." The system isolates the bandwidth surrounding the micro tremor frequency, and processes that voice signature of the audio spectrum for immediate display. The display presents the processed waveform, along with timing and amplitude data, and the responses maybe replayed as audio, upon demand. The examiner studies the processed audio waveforms as the subject speaks them. There is no significant delay, and the examiner can thus alter his questioning emphasis, based on what he sees in each answer.

The system examiner considers some thirty-two different characteristic waveforms to identify and quantify stress in the answers. Each "signature" has been valuated and quantified using thousands of examples from real interviews. The examiner's training and experience enable him or her to identify these characteristic signatures, and to evaluate them in terms of the entire interview. The examiner's output indicates whether deception is indicated or not, in terms of one or two relevant questions which are specifically prepared for the issue being addressed by the question session.

When conducting pre recorded examinations it is imperative to that a trained Voice Analysis Examiner conduct the analysis with knowledge of the circumstances of the event in question and knowledge of the context of the subject individual's responses to the event in question.

Since Voice Stress Analysis is relatively new for use within the Law Enforcement Community the main purpose of this article is to bring awareness to Law Enforcement of the technology advancements in Voice Stress Analysis and it's usefulness as another extremely valuable investigative tool. Its benefits are many which include fast positive near real

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time results.

There are several vendors that provide the Voice Analysis instrumentation, **The Diogenes Lantern Pro System, a Digital Voice Stress Analysis System. Digital Voice Stress Analyzer and the TiPi 6.40 Truster Pro.** During 2003 the United State Air Force Research Laboratory conducted an analytical study at the request of the National Institute of Justice to evaluate the effectiveness of these Voice Stress Analysis Systems for both Military and Law Enforcement. Their findings revealed that advancement of the Voice Stress Analysis technology has produced user- friendly systems and they are less evasive and less constrained in their operation than standard polygraph technology. Their study also revealed that Voice Stress Analysis is an effective investigative tool and is effective in identifying stress.

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