Diogenes developed an advanced voice stress analyzer, originally used in determining attempts at deception in law enforcement activities. Subsequently it's advanced user friendly capabilities found additional applications in deception determination in arson, counter narcotics, insurance fraud, employment screening, anti terrorism and the like. Achieving the first significant advance in voice stress analysis since development of the Psychological Stress Evaluator (PSE). Developed was a truly computerized system, which takes full advantage of digital processing to give the examiner a new set of sophisticated, analytical tools. The Diogenes Company, was formed in 1998 to continue Diogenes research and, to market and train examiners in a system that is packaged in a fully portable computer. Operational Lantern Systems have been delivered to law enforcement agencies in the United States and a host of foreign nations. Diogenes has also been awarded a contract by the Government Services Administration for sale of its software and training to federal agencies as well as to state and local anti-narcotic groups. Figure 1 indicates the appearance of a typical Lantern Voice Stress Analyzer.
The Diogenes Company

The Diogenes technical staff went on to develop the very first laptop-based Digital Voice Stress Analyzer, the Lantern™, and managed to improve the operability of the system, to make it truly portable and a real-time analytical tool, in a universal context. The electronic instrument itself—the laptop computer—may be used for any other computer functions when voice stress is not being conducted.

The Lantern Voice Stress Analysis (VSA) instrumentation, weighing less than seven pounds, is the most technically advanced system that has yet been produced to detect, process and display changes in the physiological "Micro-tremor of Lippold" in human speech. The micro-tremor itself is manifested in oscillations of eight to twelve Hertz in the reflex mechanism that controls the length and tension of a stretched muscle. Micro-tremor in the laryngeal muscles has been shown to reflect the level of stress being experienced by an individual, and to be observable in components of the individual's speech. The steady-state, or low-stress condition is seen as a randomly modulated, low-amplitude waveform, while the stressed condition usually causes a more constant, less-chaotic waveform, with typically higher amplitude. The graphical waveforms produced and displayed by the instrument can be interpreted by trained voice stress analysts to reveal the relative level of stress present in the subject.

The Lantern Professional System™ consists of three interdependent elements: the trained VSA examiner; the electronic instrumentation (software, audio recorder, and processor); and a carefully-constructed set of proven interview techniques and test protocols. All three elements must be present to form a system which can accurately discern and report variations in stress levels through changes in the laryngeal micro-tremor. Below graphically illustrates the relationship of the key elements and the peripherals of the system.

THE LANTERN SYSTEM IN GRAPHIC FORM
The trained VSA examiner bases any given examination on VSA principles that have been established over many years of experimentation and application. The examiner selects the appropriate test for each interview in advance, and then prepares a set of questions to be used in that test. These questions are strictly controlled to ensure that a stress baseline can be established to support analysis of specific answers. The analyst coordinates all questions in advance (pretest) with the subject, and maintains a questioning pacing which has been proven optimum for voice analysis.

The Lantern Professional System™

Through our perception (from our sensory systems - Visual, Auditory, and Kinesthetic or VAK, deception reveals itself by multiple unconscious analog and digital language cues. Thus indications that a person is being truthful, lying, or actively being deceptive can be recorded and analyzed.

Voice Stress Analysis (VSA) is the reading and interpretation of electronically processed stress indications, taken from one-word verbal answers to questions, and as evidenced through changes in selected portions of the voice frequency spectrum.

In practice the Diogenes Company’s Digital Voice Stress Analyzer technology for measurement of micro - dynamics of the autonomic micro - tremor, results in a system more reliable and accurate during the interrogation process generating a signature that can be observed and measured. These signatures patterns provide the feedback required for determining incongruence in an individual’s verbal cues, reflecting how an individual internally processes information that can be recorded and analyzed using the aforementioned device.

Many applications in law enforcement and security can benefit from the availability of such an analysis system. These applications can be as mundane as a verification tool for eligibility to purchase a weapon, or to identify persons with backgrounds that would prohibit them from holding certain positions of responsibility. The system can support drug-screening programs for high school, college, and professional sports. Finally, VSA can be used in sophisticated interrogations related to virtually any activity, wherein a subject wishes to attempt to conceal information or to deceive.

An example is, of course, international terrorism. Terrorism employs the gamut of criminal behavior – fraud, theft, money laundering, and the destruction of property, kidnapping, murder, and agitation propaganda. Throughout the remainder of this message, the broad example of terrorism will be used to illustrate the system and techniques of an enhanced method for detection and interpretation of stress, as an indicator of deception. While some applications, examples, and case studies do necessarily address domestic crime, the relationship to the parallel elements of international terrorism is clear.

The crushing pressure to disrupt terrorist attacks and operations in advance has resulted in the detention and interrogation of literally thousands of suspect terrorists and their confederates. Each of these individuals is also a potential source of essential information. As a result, early warning of trends and plans in the terrorist community is extremely difficult to obtain. VSA will become an essential interrogation tool for use in questioning terrorist suspects held worldwide, since it is non-invasive, and addresses characteristics of the voice which are unaffected by language or dialect. Under some circumstances VSA may be used under conditions where the subject is unaware of the analysis activity.

For some time now, VSA has been quietly developed as a powerful screening and interrogation tool of significant potential. 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-masking) 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 will greatly expand Lantern Professional System™ abilities and applications, with significant potential security and law enforcement intelligence applications benefited.

The Lantern Professional technology is a Voice Stress Analysis system developed by the Diogenes Company, to reveal and quantify the involuntary stress associated with deception. The Diogenes created product, Audio graphic™ Software, marketed as the “Lantern Professional” ™, has been upgraded and improved continuously over the years, since it was developed as a real-time replacement for the original VSA system, introduced in 1970.

Micro - tremor of Lippold. A slight oscillation, at approximately ten Hertz, that accompanies the normal contraction of human voluntary muscles. The “tremor” can be produced by a great variety of stimuli: the beat of the pulse, general movements involving a number of muscles, and even vibrations caused by passing traffic. This seemingly random vibration becomes “organized” under stressed conditions, and can be discriminated, read and characterized through its impact on the muscles used in modulating the voice. It is this modulation that is isolated and captured by the voice stress analyzer, and interpreted in real time by a highly trained examiner, to characterize and quantify the level of stress being experienced by an individual.

Screening is a VSA application directed to large-scale anti-deception programs such as drug-testing, would likely be used as a non-invasive first-order elimination to simply identify likely candidates to be recommended for more invasive testing, such as blood tests. For purposes of this discussion, a “signature” represents the unique, digitally-processed waveform of a micro-tremor present in an answer given under VSA interview.

The Diogenes Lantern™ Voice Stress Analyzer operates on proprietary 32-bit technology, using Fast Fourier Transform (FFT) techniques to selectively isolate and display the processed signatures of the micro-tremors exhibited in the subject’s answers. The Microsoft™ operating system is employed by Lantern™, in order to ensure the largest potential market for the Lantern Professional™ and compatibility with associated peripherals.

The Lantern Professional™ is the sole Diogenes product for all U.S. consumers. It is a new Diogenes product, deliveries commenced in mid-August, 2002. The large digital storage capacity eliminates the prior necessity for simultaneous operation of a recorder, it includes an almost limitless capacity for continuous data recording.

VSA depends on three inseparable elements: the electronic instrumentation (software, audio recorder, and processor), a carefully-structured questioning technique, and a trained examiner. All three elements are necessary to every VSA. The following discussion addresses formal VSA examinations, such as are conducted in the criminal justice environment. Subsequent discussions address compromises, which are adopted for VSA use under less than optimum interview or clandestine conditions.

In the case of interviews for employment, especially in positions of grave responsibility, security evaluations, and criminal or formal terrorism investigations, the process is very similar. This application normally permits setup in an optimally benign audio environment. This would be a room insulated against noise, cleared of any distractions, and with comfortable lighting, temperature and humidity conditions. It is usually furnished with a simple table and a chair for the subject and one for the examiner. In some cases, a witness may also be accommodated.
The examiner faces the subject across the table. The examiner prepares extensively for the interview. He or she learns as much as possible about the subject, and the objective of the test. The examiner then prepares the test sequence. This involves several types of questions, some are designed to document by control questions that the subject is at ease, some are intended to establish a baseline stress condition (relevant outside issue question), and others are to cause a specific reaction (relevant question) which might be useful to the analysis. Eleven to fourteen questions are used in the most popular interviews. The questions are designed to be answered with a "yes" or "no," but the Lantern™ system easily accommodates any and all verbal responses.

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 Lantern™ 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 Lantern
system examiner considers some sixteen different characteristic waveforms to identify and quantify stress in the answers. Each “signature” has been evaluated 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.

Other applications of VSA require variations in the mechanical aspects of the interview, but not the fundamental core of the interview technique. For example, if the system is used to screen airline passengers, the only equipment present at the ticket counter is likely to be the microphone, which may even be concealed. No examiner is present, and the pre-selected questions will be asked by the ticket agent as part of the routine “Did you pack your own bags?” sequence. Perhaps one or two selected questions will be added to that routine for VSA purposes. Diogenes suggests that an in-depth study of the presuppositions involved in the questions within interrogation schema will reveal new and subtle ways in which questions may be couched and then, the examiner will simply monitor the resultant waveforms in a remote location, and alert security in the event a threat indication is detected. Since this is a “screening” application, the passenger is identified as a candidate for more testing, and is taken to an area where he or she can be more thoroughly evaluated.

The scenario wherein the examiner is remote from the subject applies to other situations, as well. Motorists entering this country from the Mexican or Canadian borders can be interviewed in a way similar to that of the airline traveler, with the simple use of a microphone designed for a noisy environment. Again, the routine screening questions may be augmented by one or more VSA questions designed to accommodate the lack to structured questioning environment.

Finally, for some applications, VSA can be conducted remotely and even clandestinely via telephone or other audio link. The East German Foreign Intelligence Service, the Hauptverwaltung Aufklärung (HVA), was been reported to use a form of VSA to clandestinely test the veracity of their agent reports by making them phone in their reports. It’s rumored that this was partly done to determine the extent of false reporting by agents attempting to generate more personal income by creating the false reports.
The Future of VSA Technology is here

The 32-bit processing technology has arrived for Voice Stress Analysis, in the form of The Lantern Professional™. This capability has already opened a number of doors to higher performance. First, the storage capacity permits elimination of the cumbersome, error-prone technique of recording interviews on a tape recorder, then dumping the data to the computer for processing. That capability was already achieved with the original Lantern™ 2.8 system, but the tape recorder was usually retained as a backup copy of the entire proceedings. This was valid, because the earlier systems only processed short snippets of the interview (usually only the “yes” or “no” answers) as the result of limited storage capacity and lower processing speeds. The overriding concern was that the questions had to be recorded too, to prove that they had been properly posed. The 32-bit system can digitally process and store the questions and the answers in the hard drive, permitting perfect reproductions when copies are required.

Improved processing and storage also may open new opportunity to develop a specialized form of analysis termed “narrative analysis.” Narrative analysis refers to the ability to analyze long, uncontrolled verbal discourses. For example, intelligence specialists may wish to analyze stresses in the speeches of a person like Usama Bin Ladin, or one of his lieutenants. In the past, speech patterns and word choices were analyzed, to determine who was writing the radio speeches for Mao-Tse-Tung, or even to determine if Mao were still alive. These words are not responsive to a carefully developed sequence of questions, and may be assumed to mislead for political reasons, so new techniques must be developed. More sophisticated processors are moving this capability closer, and the biggest remaining challenge will be to develop a dynamic database for use in analyzing an individual’s prepared speech. The Lantern Professional™ VSA could provide a valuable adjunct to this sort of “open-source” intelligence gathering.
Study finds voice analysis accurately detects stress

10/23/00 - ROME, N.Y., (AFPN) -- Law enforcers may soon have an efficient and unobtrusive -- even covert -- method to determine deception during investigations.

A three-year study by Air Force Research Laboratory Information Directorate engineers here has concluded several features of voice stress analysis are effective for detecting when a person is answering questions under stress.

Funded by the National Institute of Justice, the research investigated the ability to detect and classify stress in an individual's voice, and evaluated the effectiveness of commercially available voice stress analyzers. AFRL is interested in voice stress to improve the performance of voice recognition technologies. NIJ's interest in voice stress is for enhanced police investigation.

"We concluded that several features in an individual's speech pattern are different under stress," said Darren Haddad, program manager in the directorate's Information and Intelligence Exploitation Division. "However, there is insufficient evidence at this time to say that voice stress analyzers detect deception. There are numerous forms of stress, ranging from deception to anger and fear."

The goal of the study was to determine the scientific value and utility of existing voice stress analysis technology for law enforcement applications. Voice stress analyzers have been marketed commercially to law enforcement agencies for more than a decade. The systems are cited as being cheaper, easier to use, and less constrained in their operation than polygraph machines that must be physically attached to the speaker's body.

A person does not even have to know the voice stress analysis system is being used, as the technology is claimed to be effective on telephone speech or tape recordings.

"We looked at different types of features and how those features could detect stress," Haddad said. "The more voice features you use, the more accurate your results. We also looked at what type of recording media should be used: which ones performed the best and which ones gave corrupt results.

"The Department of Defense Polygraph Institute provided us with tapes of investigations from two murder cases where the suspects eventually confessed and were found guilty," Haddad said. "Using voice stress analyzers provided by two vendors, both machines were accurate on 45 out of 45 instances."* (Emphasis added)

AFRL engineers will now propose a follow-on effort to investigate methods that differentiate deception stress from other types of stress. The research, in conjunction with the NIJ's Northeast Law Enforcement and Corrections Technology Center here, will also involve the Department of Defense Polygraph Institute and Walter Reed Army Medical Center, Va.

* One of these units was a Diogenes Voice Stress Lantern™ System.

- Air Force Research Laboratory
Unique Voice Stress Analysis (VSA) Applications

1. **Florida - Grand Jury** - The results of a Voice Stress Analysis examination were heard by a Grand Jury in the 5th Judicial Circuit, Citrus County, Florida, on April 17, 1998. The results of the examination were accepted by the Grand Jury and influenced their decision not to charge the accused. The topic was homicide; the test used was the General Series Primary Test.

2. **Washington, D.C. - Appellate Court** - Felon asks that conviction be reversed, claiming that VSA examination was coercive; forced him to make a confession. Court of Appeals, D.C., found VSA not to be coercive, not a "velvet blackjack."

3. **Utica, New York - Sexual Abuse** - A 14-year old accused of lying about being sexually abused by a priest, faces misdemeanor criminal charges. Investigators went to great lengths to find the truth, to include a voice stress examination of the priest regarding the alleged abuse. Tests cleared the priest and this reportedly was the lever, which caused the accuser to recant his statement. This begs the question; how many other accusations are also false?

4. **USMA, New York - Sexual Abuse** - Female cadet accuses male cadet of Sexual Abuse. VSA examiner finds male cadet to be truthful in denial of sexual abuse of female. Charges dismissed.

5. **Nevada** - VSA used by Psychologist to screen convicted child molesters prior to release for any unhealthy or deviant tendencies to recommit offenses for which they were convicted. Examination also designed to determine hidden unhealthy, deviant tendency to abuse substances and alcohol. Alcohol abuse found and some releases denied. Now routine program.

6. **Indiana - Large City Library System - Significant thefts** of equipment, books, videotapes and other methods of fraud and theft. Local security agency charged with library's protection concludes thefts to be externally committed. Board of Directors engages VSA Analyst to examine all employees. 477 persons were interviewed between January 10, 1999 and May 1999, in two phases. All were first interviewed with a standard test-screening test, Mixed Question Test. Those displaying stress, 28 individuals were than interrogated with a more precise test, the Modified Zone of Comparison, to precisely identify their involvement. The Attorney for the firm operating the library and the Director sat in on the initial examinations, leaving satisfied as to their fairness. Most suspects claimed they were honest thieves. A recent reduction in Library "perks" was their motivation. One admitted to some $18,000.00 in "overdue books." $77,000.00 in rental videos were identified and recovered. Two drivers were found to be deceptive. Further investigation led to $22,000.00 in overtime claims by one and a second to be a pedophile. City accepted restitution and charges were not pressed.

7. **Middle East - Industrial Espionage** - Security officials, trained as VSA examiners, employ VSA covertly to investigate suspicions of external infiltration of firm for purposes of acquiring operating techniques and technical secrets. Suspects interviewed as though a psychological employment test with material, relevant questions interspersed. Three individuals were found to be deceptive. Further investigation led to convictions of industrial espionage. To enhance covert nature of test, no computer in sight. Information collected by tape recorder and processed later.

8. **California - Defense Attorney** - The results of a VSA examination of suspect accused of Sexual Abuse found subject not to be deceptive in tests to determine truth or deception regarding the matter. Prosecution charges dropped and accused released. Not uncommon result of VSA examinations.

9. **Colombia - Theft by Burglary** - A theft of $10,000,000.00 dollars was reported by Brink's of Colombia to the National Police. The thieves rented a house across the street from the Brink's depository and proceeded to tunnel their way under the vehicle hall inside. They emerged at night and seized
The Diogenes Company

$10,000,000.00. The National Police solicited the assistance of VSA examiners. Given the threat, upon the advice of their international leadership, the tests were given remotely; no eyeball to eye ball contact by examiners was made. The Colombian VSA examiners prepared their truth and deception protocols, instructed the National Police investigators on the techniques of interview in this case, and allowed the police to conduct the interviews. The resulting tapes were then processed by the VSA examiners, establishing 16 persons to include the Captain of the Guard with deception. This led to further investigation with the 16 being charged and, reportedly, $3,000,000.00 of the stolen money to be recovered. Brink's acknowledged this VSA accomplishment with Letter of Appreciation to the examiners.

10. **Colombia – First Joint Military Screening** - Air Force personnel interviewed and interrogated by Colombian Navy Lieutenant, in Colombian Army interrogation Center. Statistical samples of Colombian Flight crews, Ground Crews and Radar operators were selected to determine reliability; unlawful behavior and knowledge of others might be guilty of unlawful behavior. Results of first increment confirmed intelligence held by Air Force, caused great consternation and was presented to Colombian Air Force Chief of Staff. Also, second set of examinations was contracted for, to include those who showed deception in the first group, conducted throughout the nation. Colombian Counter Intelligence Colonel promoted to general.

11. **Colombia - Crew Screening** - The entire crew of the Colombian Naval Training vessel, Gloria, was screened by Navy VSA examiners, supplemented by civilian VSA examiners, to determine the loyalty, veracity, and substance abuse levels, before the President visited the vessel on its departure for a world wide voyage.

12. **Colombia - National Police -Sensitive Position Survey** - Police Officers assigned to duties with anti-narcotic functions were screened for loyalty, honesty, unlawful actions, etc. in a 23 question test. 41% showed stressful reaction on from one to five questions. These were recommended for further testing.

13. **South Africa - Theft** - Multi-national firm employs local persons of native culture and language. Thefts and fraud endemic. VSA Analyst, of culture and language foreign to subjects, conducts VSA. Examinations. He proves universality of VSA by applying many years of language and cultural experience gained as a military leader of indigenous forces in the field. Displays understanding that when local states "that he does not steal," is in fact truthful in the context of his belief that it is the examiner's culture that is in fact "the thief of his nation's wealth." Thus, the Analyst must carefully design his examination to faithfully satisfy all elements of the test protocol.

14. **Up State New York, Homicide.** The investigators were on the wrong track until the Lantern Voice Stress Analysis was employed by one of the unit's detectives trained in the system. Immediate and strongest suspect consented to the VSA test and the results were interpreted as not deceptive about not killing the individual. This is a robbery, homicide case and the test showed the subject had "high stress" reactions to the robbery questions. The victim was the suspect's father. Subsequently, further testing determined that the suspect was routinely stealing money from his elderly father, but did not do so on the day of the homicide. Two other suspects were developed and one took the Lantern VSA test. The results established deception on his part to the crime questions. When confronted with these results. He ultimately confessed and he and his accomplice were arrested for the homicide.

15. **Indiana - Teenage Satanic Cult** - Police Chief with many years of Voice Stress Analysis (VSA) experience in a community experiencing the results of Satanic Cult activity turns to covert application of the VSA capability to collect intelligence as the basis for further actions. Judge approved technique, and objectives. In this case, process was to interview 27 suspects with General Question Test, 17 were confirmed by the MDOZ test, with noticeable stress, engendered by "non-verbal, deceptive indicators." The identified persons and their families were served subpoenas to appear in court by the prosecutor. At that time the families were charged as well as the kids, and the cases were held pending successful family supervision of the kids. Also, from the investigation came the identification of kids who signed up to enter a Satanic Church in a neighboring city by an individual who was charge by the ATF with arson of church in that same city. During the investigation the police received threats, dead, headless cats on the doorstep,
etc. the ATF did cooperate in this investigation. The community solved its own problem though leadership and application of community resources. The VSA used his laptop computer covertly in this case. There were no wires cables, microphones or other devices in sight. Collection of replies made by the suspects to his questions was made through the keyboard microphone. Immediately, in four seconds the response was processed, displayed in real time, and the next question was initiated. This capability also allowed the analyst to formulate additional questions based upon the results of his initial questions. The suspects thought he was merely taking notes. The intelligence acquired was not intended for prosecutorial purposes.

16. **Cleveland Ohio -Narcotic** Officers Accused of Planting Evidence Cleared by Lantern VSA, using technique of Narrative Analysis of Court Testimony. Narcotic investigators viewed illegal substances in suspects home while making phone call. Also, searched suspect's pickup truck, finding cocaine. Substances were seized as evidence. Jury Trial found accused not guilty. Accused sues five Cleveland Police Officers for damages. Federal trial concludes when accused "live-in" testifies that there were always illegal substances in the home, and the truck was used to transport illegal materials to accused nightclub. Despite outcome of federal case, officers felt they were never cleared." Public service initiative on the part of local TV Station, called upon Voice Stress Examination of material tape recordings relating to the case. Lantern VSA examiner conducts detailed narrative analysis of audio evidence and concludes, without reservation that the five officers, were not deceptive in their testimony relating to the incident. Local Cleveland TV station produced a two-part public service program reviewing all aspects of the case, to include the VSA report, concluding that the officers were innocent of the charges and that their reputations had been rehabilitated.
DIOGENES
VOICE STRESS ANALYSIS SYSTEMS

UNIQUE BENEFITS

• This most advanced scientific system utilizes Windows 98™ to XP home™, compatible notebook computers and plain paper printers for total universality and portability.

• No special printer paper or EKG chart tape required.

• Approved for export with some restrictions by the US Department of Commerce.

• Minimum transition from polygraph, Psychological Stress Evaluator, Humble systems, Verimetrics, or Mark II techniques.

• Standardized instruction approved by the International Society of Stress Analysts. (ISSA)

• All Instructors are International Society of Stress Analysis certified to the rank of “Analyst”.

• Proper analysis is conducted in the same manner as any other VSA instrument capable of creating stress pattern charts. However, in a unique process, numerical analysis of 16 stress patterns.

• Unlike polygraph there is no need to wait 15 to 30 seconds between examinee answers and the examiner’s next question. VSA response interval is 4 seconds.

• Stress experienced is inverse to the amplitude of muscle micro-tremor displayed in the derived waveform in each utterance. (A more chaotic pattern indicates less stress is present.)

• Sound capturing via built-in microphone, external microphone, or tape recording from any sound source either digital or analog i.e., television, radio, telephone, etc.

• Computerized, digital screen display of each speech utterance.

• Real time graphic display of sound waveform for speech pattern comparison, scientific identification, and noise identification.

• Replay of each utterance (or noise) through computer speakers for exact identification of each sound.

• Real time display of derived stress pattern.
• Immediate examiner question options from real time display.

• On screen standardized test question formats and report/analysis display.

• Screen display and/or paper printed analysis of stress.

• Derived waveform are displayed at real time or expanded for in-depth analysis of amplitude-modulated cycles.

• Covert and "conversational" capability, either: real-time or from tape-recorded source.

• Narrative speech charting capable. Outdated polygraph and other VSA systems only display one-word answers.

• Capable of 5 minute duration narrative speech and stress pattern display.

• Single or multi-utterance display.

• Length of utterance displayed in seconds and decimals.

• Portion of any sound or utterance display isolated for identification and analysis of derived stress pattern.

• Graphic labeling of questions and answers on final printed charts for reporting and presentation purposes.
The Diogenes Company

Sales Product List

All Diogenes™ Voice Stress Analysis Systems perform to the same high precision standard. Each is capable of real-time display of both processed and unprocessed waveforms; individual word and sound isolation; audio playback; digital storage; and prompt hardcopy printout on IBM compatible printers sold today. Each instrument includes an 80-page Examiners Reference Manual, one software security “key” and the essential licensed-use of Diogenes Windows™-based Audiographic™ Voice Stress Analysis Software. All prices $ US, US BANK

1. The LanternPro™ DDVSA™ is the most advanced voice stress analysis software available anywhere. Installed on any laptop or desktop computer, it is a complete system. Installed on a laptop computer, this system is fully portable giving full flexibility to the examiner. The instrument may be connected directly to an external computer monitor, TV monitor, or video projector whenever a larger screen is needed. It is powered by standard power (110V AC). Our software can be installed on multiple computers within your organization and then only requires a hardware enabling device to activate the software giving the examiner full flexibility to work where it is needed.

4. Sony Digital Recorder ICD MS 515 – 8MB.
With Sony uni-directional microphone ECM-DM5P State of the art, high capacity (8 hour) digital recording. Matches digital effectiveness and flexibility of Diogenes Lantern Professional Audiographic™ Software

5. Canon BJC-80 Bubble-Jet Printer. As an option to establish a complete and portable instrument with your laptop instrument, we offer the current model of the Canon BJC Bubble-Jet printer. Diogenes™ has tested this unit in the field for over four years. It is a favorite of people on the go.

6. Basic Five-Day Certificate Training. Training classes are held periodically in different parts of the country, to provide entry-level training programs in voice stress analysis. These classes require one week (60 hours credit) and are divided into classroom instruction and independent guided study. Qualified instructors, experienced in law enforcement and in voice stress analyses, have been specially selected for their organizational and classroom skills. Curriculum includes truth verification history, interview skills, testing technique, chart interpretation, instrument familiarization, case histories, practical exercises, and more! Formal certificates are awarded successful graduates.

7. Advanced Five Day Examiner's Certificate Course. A five day, advanced course for examiners who have completed the Diogenes Basic VSA Examiner's Course or any other such Basic VSA Course. (The course is not instrument specific) This, as are all Diogenes' courses, presented by International Society of Stress Analysis certified "Analysts" who are recognized leaders in their field. Successful participants will also be prepared to testify as "knowledgeable individuals" in legal matters regarding the art and science of VSA as a truth
verification technique. 80 Credit Hours (60 Course Hours and 20 independent study hours) and Certificate awarded.

8. One Day Voice Stress Analysis Training For Criminal Investigators. Insurance investigators, Claims Investigators, Arson Investigators, Background Investigators, Sexual Abuse Investigators, Social Service Investigators, Fraud Investigators, 16 Credit Hours and Certificate Awarded

9. Independent Voice Stress Analysis. Diogenes TM Staff Analysts operating through four voice stress analysis laboratories around the nation will provide a high-confidence stress analysis, to include basic Voice Identification analysis, of legitimate interview material (audio recordings, VSA printouts, Diogenes TM digital files), when provided with background data, to include a complete transcript of the interview. Normally, the results of these analyses will be provided to the client, by FAX, within three working days of Diogenes TM ™ receipt of the material. Originals will be subsequently mailed to the customer. Cost quotations may be provided in advance, on telephonic description of the situation and the number of responses to be studied. Authorization to proceed must be provide via authoritative signature on FAX. Item D1302 price is $100 per hour (Minimum Charge: Three Hours)
THE DIOGENES COMPANY

LANTERN™ PROFESSIONAL

SOLE SOURCE STATEMENT

The Diogenes Company is the sole producer of 32-bit digital voice-stress analyzers capable of meeting, as a minimum, all elements of the following technical specification for voice-stress analysis systems.

1. User-friendly Audiographic™ software-based system
2. Proprietary 32-bit data format
3. System compatible with any 16/32-bit Microsoft host computer
4. System compatible with any 16/32-bit Microsoft host printer
5. Response isolation from ambient noise
6. Unlimited* continuous recording
7. Audio input a continuous set of Questions and Answers or unstructured speech
8. Audio sources include telephone, television, records, analog, digital, covert
9. Instant digital voice replay capability
10. Adjustable compression ratio
11. Internal text report generation capability

* Limited only by the size of your hard disk drive

Diogenes literally invented modern digital voice stress analysis with the introduction of its original Lantern VSA system in 1995, which was the World’s first laptop-based digital voice stress analyzer. The company has continued to develop and expand that technology to remain the producer of the most advanced systems in the industry. The 32-bit technology Voice Stress Analyzer is the proprietary development of The Diogenes Company. No other manufacturer currently offers full service 32-bit VSA systems.
# REPRESENTATIVE REFERENCE LIST FOR INSTRUMENTATION AND TRAINING

## ARKANSAS

- Deputy Chief Tim Helder  
  Fayetteville P.D.  
  479-587-3555

- Detective Tim Franklin  
  Fayetteville P.D.  
  479-587-3520

## CALIFORNIA

- Steve Ulrich, (Ret. CHP) Private Investigator  
  Sacramento  
  916-454-4642

- John Fay Sr. Dep. (Ret.) Private Investigator  
  Crescent City  
  707-464-7642

## CONNECTICUT

- Sergeant Glenn Guay  
  Putnam P.D.  
  860-928-9433

## FLORIDA

- Sgt. Malcolm Thompson (Ret.) 1998 NAPO, Top Cop  
  Kissimmee P.D.  
  407-846-8942

- Mike Sylvestre, Analyst  
  Orlando  
  407-762-1180

## GEORGIA

- Nelson Spriggs, Private Investigator, Fraud Investigator, Voice Stress Examiner  
  912-264-4210

## IOWA

- Detective Ted Heitz  
  Bettendorf P.D.  
  319-344-4043

## LOUISIANA

- Debbie Hall, Investigator  
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  West Monroe P.D.  
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- Det. Neal Horvath  
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- Det. Charles Roark  
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  318-329-2600

## MARYLAND

- Robert Keller, Investigator  
  Greenbelt P.D.  
  301-507-6530

- Dwayne Stanton Homicide Detective, (Retired). Washington D.C., Lanham  
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NEVADA
Dr. Steven J. Roth, PH D, Psychotherapist         Reno   775-688-2001
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Luz Marina Restrepo, Operations Manager Diogenes De Colombia 011-571-218-1825
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THE DIOGENES COMPANY

BASIC STANDARDIZED COURSE OF INSTRUCTION
FOR
VOICE STRESS ANALYSIS EXAMINERS
40 HOURS

COURSE OUTLINE

INTRODUCTION

OPENING REMARKS

Overview of Course of Instruction
Examiner's manual
Study Guides and Handouts
Confidentiality of topic discussions

HISTORY OF "DETECTION OF DECEPTION"

Origins OF INSTRUMENTATION
Keeler, et al
Descriptions of polygraph instrument
Legal requirements to maintain outdated equipment and methods (for the protection of polygraph trade)

Bell, Ford, and McQuiston and the Psychological Stress Evaluator. (PSE)1976

Lippold's Muscle Micro-tremor.

Validation Studies of PSE and Voice Stress Analysis

Standardized chart reading of VSA instruments.

Mark II, Fred Fuller, 1978 (and similar VSA instruments utilizing "amplitude" as criterion)

Verimetrics Computerized Voice Stress Analyzer, McQuiston 1984

Humble Systems

Diogenes, Lantern, 2001
VALIDATION STUDIES OF VSA

The DEKTOR Counterintelligence and Security, Inc. Studies
Kubis Study
Carnahan Study

HOMEWORK ASSIGNMENT -- Reading sections of Examiner's Manual.
Legal Aspects of VSA.
Employee Polygraph Act.
Understanding State Laws and Restrictions.

THE "SCIENCE" OF TRUTH VERIFICATION
UTILIZING VSA

PSYCHOPHYSIOLOGY

PSYCHOLOGY

Behavior:
Emotion:
Conscious Experience:

Motivation

Homeostasis

Emotions

a. Internal
b. Overt
c. Stimulus
d. A person's ability to control emotions
e. Reaction
f. Implicit set.
g. Explicit set.

It is reasonable to expect that when the entire psyche is absorbed in a problem, irrelevant stimuli will not intrude.
PHYSIOLOGY

THE NERVOUS SYSTEM

The CENTRAL nervous system
The AUTONOMIC nervous system

SYMPATHETIC NERVOUS SYSTEM
PARASYMPATHETIC NERVOUS SYSTEM

We are concerned with measuring stress caused by psychological stimuli and the end physiological response (the voice) that we are using as the medium for indicating psychological stress.

PHYSIOLOGICAL ASPECTS OF VOICE

PHYSIOLOGICAL TREMOR (MUSCLE-MICRO TREMOR)

DEMONSTRATION OF IDENTIFICATION OF AM AND HOW FM IS OBSERVED IN PATTERNS.

REVIEW OF THE DIOGENES LANTERN AND BRIEF OPERATIONAL DEMONSTRATION.

SIMPLIFIED CHART READING

Review of Identifying AM and FM on the Diogenes Charts
Different patterns
Numerical evaluation
Chart reading exercises
Standardized Chart Marking

HANDS ON EXPERIENCE WITH THE DIOGENES LANTERN

HOMEWORK ASSIGNMENT -

Continue to operate the Lantern
Enter "Yes" and "No" answers, chart same.
Enter multiple words, chart same
Learn to use the computer with ease.
Learn to "Que." the tape recorder.
Practice the "4 second" rule.
THE "ART" OF
TRUTH VERIFICATION WITH THE DIOGENES SYSTEM
TRUTH VERIFICATION EXAMINING

PREPARATION FOR TESTING

Data collection, forms, case reviews, the examination suite, equipment, personal aspects.

PRETEST INTERVIEW

Examinee data collection, forms, control, leveling techniques, testability, releases, pre-test statements, written statements, oral statements, establishing rapport, tape recording.
Explanation of the instrument, procedure, etc.
Explanation of questions to be asked.
Formulate test questions from available data and the pretest interview.

Irrelevant questions
Relevant questions
Control questions
Outside issues
Develop the guilt complex (hypothetical) issue

ACTUAL TESTING

Selection of proper test structure, Review with subject, instructions to subject, instrumentation, the tests.

POST - TEST INTERVIEW

HOMEWORK ASSIGNMENT - Chart reading of pre-recorded examinations

RESTESTING

FINAL POST-TEST INTERVIEW

Making the "call", Summarize with the subject, the final test results, Deception Indicated, No Deception indicated.
Obtain a written statement.

REPORT WRITING

QUESTION FORMULATION

Explanation of legend of question types
Explanation of different types of test structures
CHART READING AND INTERPRETATION

Charting of prerecorded tests
Analysis
Chart marking
Discussion & Writing a report

HOMEWORK ASSIGNMENT -- Chart reading of pre-recorded examinations.
Use of Lantern System

THE ART OF COVERT AND NARRATIVE STATEMENT ANALYSIS

Equipment
Types of loss, crimes, investigations
Investigative techniques
Formulation of questions
Use of telephone
Use of covert tape recorders
Use of VSA techniques by investigators.
Charting and analysis
Report writing

FINAL EXAM

SETTING UP A PRIVATE PRACTICE

COURSE REVIEW

Final Examination reinforcement, questions and answers reviewed
Course Critique

DIPLOMA CEREMONY
**VOICE STRESS ANALYSIS\nRECOMMENDED READING LIST**


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