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**Structured Interview Assessment  
of the  
Field Use  
of  
Voice Stress Analyzer Technology**

**March 30, 2007**

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## Executive Summary

The original goal of this study was to assess the effectiveness of Voice Stress Analyzer (VSA) technology, including its validity and reliability, by members of the Armed Forces of the United States in a military field environment. Unfortunately, the Department of Defense (DOD) issued a general order during the early stages of this project instructing DOD interrogators to cease using VSA devices. The majority of DOD interrogators and practitioners using VSA were quickly redeployed and not available for interviews. Consequently, the project staff chose an alternative approach where civilian law enforcement officials who used Computer VSA (CVSA) technology were interviewed. While the environment for civilian police officers is much different than the military, the expectation was that obtaining insight concerning CVSA use in the civilian sector would prove beneficial for military decision makers.

Eighty-one (81) civilian police officers from 81 different police agencies were asked 47 questions concerning their experience with CVSA via a confidential telephone interview. This survey-based descriptive study summarizes their responses and provides insight into the CVSA operational experience of these officers. These 81 police officers are a small portion of the CVSA examiner workforce in the United States; however, they represent approximately 1,500 combined years of police experience with over 14,500 completed CVSA examinations.

The majority of the survey respondents in this survey believe that CVSA is a useful tool. The CVSA's primary utility is associated with its use as an additional tool to help with a specific subset of criminal cases and pre-employment screening. Other conclusions include:

- Police officers like CVSA because it helps them clear cases
- Police officers cite ease of use, portability, and timeliness as beneficial characteristics of CVSA
- CVSA effectiveness is extremely dependant on interrogator skill
- The interview protocol is extremely important for success
- Approximately 75 percent of all deception indications are verified by confessions
- Approximately 44 percent of the survey respondents volunteered that CVSA is not 100 percent accurate
- The key goal of CVSA interviews among police officers appears to be obtaining confessions
- Survey respondents believe that CVSA appears to provide indications of stress

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## Introduction

Voice Stress Analysis (VSA) is a deception detection technique. The approach is based on the theory that telling a lie is stressful. This stress is then manifested by changes in the voice that can neither be knowingly controlled nor detected by normal hearing. Thus, suitable technologies can detect indicators of stress and, through extrapolation, determine whether a subject is lying by measuring the presence and amplitude of these micro-tremors.

The original goal of this project was to evaluate the validity and reliability of VSA devices used by members of the Armed Forces of the United States (US) in military environments through face-to-face interviews. Unfortunately, the Department of Defense (DOD) issued a general order during the early stages of this project instructing DOD interrogators to cease using VSA devices. Afterwards, the majority of DOD interrogators and practitioners using VSA were quickly redeployed and not available for interviews. Consequently, the project staff then selected an alternative approach, whereby civilian law enforcement officials using VSA were interviewed.

### ***Background and Project Focus***

US civilian law enforcement officials use VSA technologies. The project staff reasoned that the experience of civilian law enforcement professionals could provide insight into the use and effectiveness of VSA. While the experience of civilian law enforcement personnel differs in many ways from DOD interrogators, the staff expected that the civilian experience would be useful in evaluating the suitability of VSA technologies for DOD-related interrogation and law enforcement activities.

The original project plan called for key elements of information to be collected during the interview process. These included:

- Type of VSA device employed
- Number of successful detections and unsuccessful detections
- Method of success determination
- Methodology to verify the information obtained
- Pretest, in-test, and post-test techniques employed
- If the VSA device was used in combination with other devices or techniques
- The experience level of the examiner
- Any other VSA or credibility assessment training the examiner possessed
- If the VSA test was conducted live or used recordings
  - If recorded, how (in-person, remotely, quality of recording)
  - If the decision to record was made real time or at a later time, who was involved in the decision making
- Observation of how VSA was being conducted in the field

The refocused project retained the majority of these requirements; however, the requirement to observe VSA use was eliminated due to privacy and logistical concerns.

***VSA Technologies***

There are several models of professional quality VSA systems on the market in the United States. These include the Computer VSA (CVSA) manufactured by the National Institute for Truth Verification (NITV) and the Layered Voice Analysis (LVA).

There are also numerous less costly VSA systems on the market that appear to be designed more for entertainment than professional use. These include handheld units and software packages designed for use on personal computers.

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## Methods

### ***Questionnaire Development***

The project staff developed the interview questionnaire in concert with the sponsoring agency of this study (CIFA/DoDPI). The staff first developed a draft questionnaire addressing the key elements identified by the sponsor. The sponsor reviewed this questionnaire and directed certain modifications. To validate the revised questionnaire, the project staff tested it on five survey respondents after which the staff analyzed the results and incorporated appropriate revisions to correct problems in wording or question understanding. Based on these changes, project staff generated the final questionnaire.<sup>1</sup> In its final form, the project staff estimated that the survey respondents would need 15 minutes to complete the questionnaire.

### ***Sample Pool Development***

The study considered only VSA practitioners using the CVSA manufactured by NITV. Practitioners using VSA technologies developed by other manufacturers would have also been considered in the study; however, there was no easily available list of police departments using these other devices. NITV listed over 1,600 law enforcement organizations on their website as users of their technology.<sup>2,3</sup> These organizations included police and sheriff departments, district attorney offices, correctional facilities, and DOD-related organizations. The list included each law enforcement organization name, its associated state, and point of contact. The project staff used this list in July 2006 as the source of names for potential civilian law enforcement participants in the study.

The project staff developed a contact database that held the names of officials associated with police departments and sheriff offices. Organizations such as prisons, district attorney offices, and other non-police organizations were not included since there was concern that their use of CVSA would be different than that of police agencies. **The resulting list included 1,098 police and sheriff departments.** The project staff obtained additional information including each organization's mailing address and telephone number from a website providing contact information on police and sheriff departments nationwide.<sup>4</sup> All data was maintained in the contact database.

### ***Sample Selection***

Ideally, one would randomly select a sample from the list of 1,098 individuals and call each of them without any notice. The caller would provide a short description of the study, and the subject would be asked if he or she would like to participate in the interview. This approach would give each of the users an equal opportunity to participate without prior awareness of the study or its purpose.

Although this approach is regularly used, it was deemed unsuitable for this study due to the unique nature of the study population and the potential sensitivity of the topic. Since law enforcement officers work in an environment of high stress and high workload, and often deal with difficult subjects who are challenging on many levels, this sample population is considered unique. Consequently, the project staff

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<sup>1</sup> The results of these five interviews were discarded and not used in the final analysis.

<sup>2</sup> [www.cvsal.com/Agenciesusing.htm](http://www.cvsal.com/Agenciesusing.htm)

<sup>3</sup> It appears that these names have been removed from the website.

<sup>4</sup> [www.usacops.com](http://www.usacops.com)

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feared that the police officers would be hesitant to discuss their work with strangers. If this fear proved true, then obtaining a meaningful number of completed interviews would be difficult.

Another factor potentially compromising police officer participation in the study was the perception among some in the police community that VSA technology has been unfairly criticized by DOD and those associated with the polygraph community. This concern was highlighted by the number of police officers that reported they contacted NITV to ask about the veracity of the study.

For these reasons, the project staff decided that the 1,098 potential police officer interview subjects would first be contacted by mail to briefly explain the study and to ask them to participate. Accordingly, the project staff sent each of the 1,098 individuals listed in the study contact database a package that included a one-page letter describing the study and a pre-paid postage response form.

The letter was written on the letterhead of the research company conducting the study. It described the study, identified its funding agency (DOD), promised anonymity, and provided a point of contact for questions. A copy of this letter is found at Attachment 1.

The postage pre-paid return form provided an opportunity for the recipient to opt in or out of the study. Additional information was requested on the form including the number of CVSA examiners at the respondent's organization and corrected point of contact. A copy of this return form is found at Attachment 2.

Each letter and return form contained a tracking number so each individual's response could be collated with the original mailing database. This number was only used to flag survey respondents in the contact database and eliminate errant follow-up calls to those who did not respond. To ensure anonymity, tracking numbers were not contained in the analytical database and were destroyed once the project staff completed the data collection phase of the study. The project staff interviewed only one CVSA examiner from each police or sheriff department.

Use of this approach ensured a willing sample of study participants but introduced a potential self-selection bias that could influence the results. The risk of the self-selection bias was considered compared to the risk of non-response with a cold-call interview request, and the project staff concluded that the potential self-selection bias was a necessary risk to ensure the study had enough willing participants. The presence and effects of this bias are discussed further in the *Limitations* section of this paper.

### ***Data Collection, Non-Response Assessment***

A significant number of potential survey respondents did not return the postage pre-paid form (see the *Findings* section in this paper). Understanding why individuals did not respond was considered important since it could provide insight into the characteristics of those who did respond and how well they represented the CVSA police officer community at large. Consequently, the project staff conducted only a single follow-up call to a sample of non-respondents. If contact was made, the individual was asked why he or she chose not to participate. The interviewer recorded the response and thanked the non-respondent. The responses to these follow-up calls are described in the *Findings* section. A copy of the follow-up questions is found at Attachment 3.

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## ***Data Collection/Questionnaire Application***

Use of the questionnaire was limited to those who responded affirmatively to the participation request form. Participants were selected randomly from this list and called. If no contact was made, the participant's name was returned to the sample pool where he or she remained eligible for another call. The project staff continued this process until the interview was completed, the subject opted out of the interview process, or the time allocated for completion of the interviews was exhausted.

Completion of the interview was conducted via telephone. Once contacted, the interviewer read a short statement that reiterated the focus of the study, identified the funding organization, stated the length of the expected survey, and ensured the subject anonymity. The interviewer concluded by asking the subject if he or she would like to participate in the study. If the subject responded positively, the interviewer conducted the interview, and the project staff transcribed the results and recorded them in the electronic database.

Once the project staff completed the interviews, the staff reviewed, cleaned, and categorized the collected data. Software used in the process included Microsoft Excel, SPSS version 15.0, and SPSS Text Analysis Version 2.0. A copy of the questionnaire is found at Attachment 4.

## ***Data Coding and Cleaning***

A number of questions in the interview were open-ended and allowed the survey participants to provide free-form responses. These responses were transcribed into the database for ease of analysis (all of these responses are found at Attachments 5-9). The principal investigator analyzed and summarized the responses using a text categorization tool (aided by additional interpretation). The categorization of each open-ended question resulted in two to three new variables that were used to provide insight into the responses to the open-ended questions during the analysis of these responses.

The project staff reviewed the responses to the close-ended questions for data entry errors using the original survey form as a reference. If errors were discovered, the staff made appropriate corrections.

## ***Analysis***

The project team performed calculations for frequency of response to each question; rates, in the form of percentages (where appropriate); and mean, mode, and median values along with value sums and range of responses. The results of these analyses are presented in several tables and figures in the *Findings* section.

## Limitations

### ***Self-Selection Bias***

There are a number of limitations that should be considered when reviewing the results of this study. As mentioned earlier, there is a possibility that a self-selection bias may be present. This type of bias is associated with the characteristics of the respondents who chose to participate being different from those who chose not to participate.

The goal of any survey is to obtain information that is representative of the total population; in this case, all police officers using CVSA. Consequently, it is desirable to select a sample for the survey that mirrors the total population in key characteristics (use of device, experience, etc). Allowing respondents to self-select in response to the mail invitation may have somehow biased the results. For example, it may be that those who have a less positive experience with CVSA chose not to respond while more enthusiastic supporters of the technology chose to respond. Clearly, such a bias would present a picture that would not be representative of the total population using CVSA. On the other hand, it may also be possible that only dissatisfied users of the CVSA technology responded.

The presence and impact of this type of self-selection bias is unknown but could result in findings that are not representative of the CVSA user at large. Analyses undertaken to assess the presence of this bias are discussed further in the *Findings* and *Discussion* sections of this report.

### ***Study Politics***

It appears that when the project staff mailed the initial package, many police officers contacted the manufacturer of the CVSA to ask about the legitimacy of the study and whether they should participate. These personnel expressed concern that the study might be an effort to discredit CVSA technology. Subsequently, representatives from the manufacturer (NITV) contacted the study's principal investigator to inquire about the study. The principal investigator explained to the NITV representative that the goal of the study was to understand the how CVSA was used in the field and to capture how well the CVSA worked. The NITV representative responded by indicating they would encourage police officers who called to participate if contacted by the study team.

The extent of the manufacturer's influence on potential respondents is unknown. It was clear that the study received considerable attention within the CVSA community based on comments provided by study participants.

### ***Limited Technology Representation***

As mentioned earlier, a number of manufacturers build VSA machines that can be considered "professional" units. In this study, however, only users of one model, the CVSA, were selected to be interviewed. This was due primarily to a logistical issue in that the CVSA manufacturer made a list of its users publicly available. While all the manufacturers base their machine on the theory of stress-related changes in the voice, it is possible that there may be some key technologies that make one manufacturer's machine more sensitive or specific than another's. This issue could not be evaluated in this study.

***Principal Investigator's Knowledge***

The principal investigator decided early in the study design process (with the concurrence of the study's original project manager) not to familiarize himself with past research associated with VSA reliability and validity. This was done so as to eliminate or at least limit any possible influence of inaccurate or biased assessments of VSA accuracy or effectiveness during the design and conduct of this study. The difficulty with this approach is that the lack of specific detailed knowledge may have somehow compromised the ability of the principal investigator to recognize key issues that should have been addressed during the survey process.

## Findings

This section of the report provides a summary of the findings from the survey by describing each of the tables and charts and highlighting key points. Additional interpretation and explanation of the findings are provided in the *Discussion* section of the report.

### Mail Package Response

Figure 1 presents the distribution of responses to the participation request mail packages. The project staff mailed 1,098 packages. Of these, police officers returned 151 packages stating that they were willing to participate in the survey (Yes = 14 percent), while sixty-four (64) respondents declined (No = 6 percent). Thirty-three (33) mail packages were returned (3 percent) and 14 police officers requested more information before they decided to participate (1 percent). Follow-up information was not obtained from 836 police officers (Unknown = 79 percent).

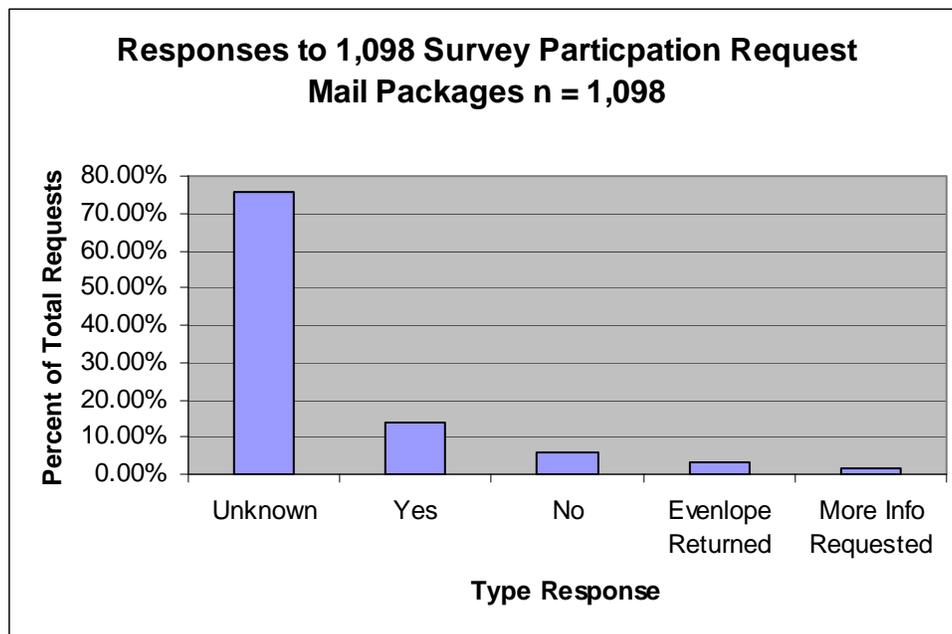


Figure 1: Response Rate

As mentioned earlier, self-selection bias was a possible problem with the design of the study. One method to evaluate the potential impact of this bias is to compare groups willing to participate in the survey with those who chose not to participate. If the two groups are similar among multiple measures, one might be more confident that the two groups, as a whole, are similar, and the need to account for any possible skew in results due to a self-selection bias would be mitigated.

Unfortunately, the only variable the project staff collected for respondents willing to participate and those not willing was the total number of CVSA trained examiners and the total number of active CVSA examiners. Table 1 provides a summary of a comparison of the mean number of CVSA examiners for each group. The results shown in Table 1 indicate that there is very little difference in the average number of CVSA examiners between the police departments that were willing and those that were unwilling to participate in the CVSA survey. While the results of this analysis provide very little insight

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into the possibility of self-selection bias, it does indicate that at least by this measure the two groups are very similar.<sup>5</sup>

**Table 1: Mean Number of CVSA Examiners for Police Departments by Willingness to Participate Status**

| <b>Mail Response</b>                 | <b>Number of CVSA Examiners</b>                 | <b>Number of Active CVSA Examiners</b>          |
|--------------------------------------|---|---|
| <b>Willing to be interviewed</b>     | Mean = 2.85<br>N = 149<br>Std Deviation = 1.906 | Mean = 2.52<br>N = 147<br>Std Deviation = 1.697 |
| <b>Not willing to be interviewed</b> | Mean = 2.05<br>N = 20<br>Std Deviation = 1.701  | Mean = 2.50<br>N = 18<br>Std Deviation = 4.829  |
| <b>Total of Both Groups</b>          | Mean = 2.75<br>N = 169<br>Std Deviation = 1.895 | Mean = 2.52<br>N = 165<br>Std Deviation = 2.232 |

Of greater concern is the fact that 79 percent of the police departments contacted did not respond in any way. This means that nothing is known about their reason for not responding or if this cohort is somehow significantly different from the cohort of those police departments that did respond.

Low response rates are a serious problem for survey research. Since the presence of a low response rate raises the distinct possibility that the non-respondents are different from those that did respond, this may represent a non-response bias. In addition, the issue of low response rates is also often associated with the application of surveys via mail. Mail surveys can result in low response rates of 10% for general populations unless specific countermeasures are taken.<sup>6</sup> This problem can be exacerbated for specific types of groups such as physicians, chief executive officers (CEOs) and other persons who are in extremely busy professions.<sup>7</sup>

In an effort to gain more insight into this issue, the project staff conducted follow-up phone calls with the police departments of the 276 non-respondents to learn why they had not responded. Only one attempt was made to contact each police department. Of the 276 calls attempted, the project staff made successful contact with 123 police departments. The other 153 calls were either answered by an answering machine or were unanswered due to an incorrect telephone number.

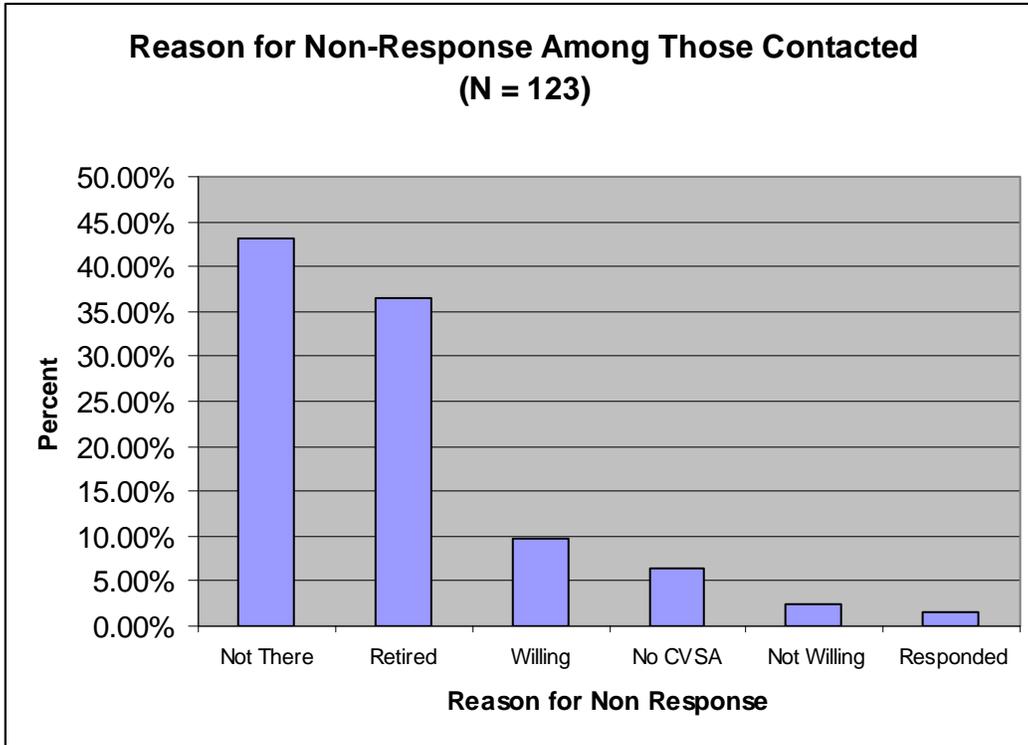
Figure 2 shows the distribution of the 123 positive responses.

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<sup>5</sup> The slight difference shown is not statistically significant.

<sup>6</sup> Backstrom CH, Hursh-Cesar G, *Survey Research*, 2<sup>nd</sup> ed., (New York: McMillan Publishing, 1981), Pg. 117.

<sup>7</sup> Maheux B, Legault C, Lambert J, "Increasing Response Rates in Physicians' Mail Surveys: An Experimental Study", *American Journal Of Public Health*, May 1989, Vol. 79, No.5.



**Figure 2: Reason for Non-Response**

Fifty three (53) (or 43 percent) of the police departments stated that the officer identified as the CVSA representative was no longer in that position. This may have been due to the officer leaving the department or because he or she had moved to another position. Forty-five (45) (or 37 percent) of the officers had retired. Twelve (12) (or 10 percent) indicated they would be willing to participate but had not received the package, while 8 respondents (or 6 percent) indicated that they no longer, or had never, used CVSA. Finally, 3 respondents (or 2 percent) said they did not want to participate and 2 persons (or 1 percent) indicated they had mailed the invitation response package.

These results indicate that 80% of the non-respondents in this call-back sample were police officers who were retired or no longer in their positions. If this pattern is true for all the non-respondents who were sent an invitation package, it is probable that a large percentage of the non-respondents were police officers who had retired or left their respective police department. Considered in this light, it is possible that the actual response rate to the survey invitation among those who received the invitation was much higher than originally thought since the actual number of police officers successfully contacted is a higher percentage of those who are still working than that of the original 1,098 attempted contacts.

For those who responded to the original invitation mail package or the follow-up calls, the principal investigator made a comparison between those willing and not willing to participate in the survey. As shown in Table 2, the responses demonstrated roughly similar patterns.

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Table 2: Comparison of Response Willingness

| Response Group  | Participation Willingness |    |       |
|-----------------|---------------------------|----|-------|
|                 | Yes                       | No | Ratio |
| Initial Mailing | 151                       | 64 | .42   |
| Follow-up Calls | 12                        | 8  | .66   |

Respondents Who Completed the Survey

The project staff conducted eighty-one (81) survey interviews.<sup>8</sup> This represents 7.38 percent of all police departments listed on the NITV website as having purchased a CVSA. The following tables and figures provide a summary of the responses from those officers who completed the interview survey.

Background Questions

Table 3 provides insight into the average number of CVSA examiners at police departments where a police officer completed an interview.<sup>9</sup> The first data column in the table shows that the total reported number of trained CVSA examiners on staff ranged from 1 to 8 with a mean value of 2.82 examiners. In many cases, fewer examiners actually conducted interviews using CVSA than were on staff. This is reflected in the second column where the number of active examiners ranged from 1 to 7 with a mean value of 2.56. One police department that indicated a desire to participate in the survey, but was not randomly selected for interview, had 15 examiners on staff.

Table 3: Average Number of Trained and Active CVSA Examiners

|         |         | # CVSA Trained | # CVSA Active |
|---------|---------|----------------|---------------|
| N       | Valid   | 79             | 77            |
|         | Missing | 2              | 4             |
| Mean    |         | 2.82           | 2.56          |
| Median  |         | 2.00           | 2.00          |
| Mode    |         | 2              | 2             |
| Minimum |         | 1              | 1             |
| Maximum |         | 8              | 7             |

Table 4 lists the titles of the police officers who completed the telephone interview (survey question 2 – Q2).

<sup>8</sup> Only 81 interviews could be completed during the time allocated for this study due to scheduling difficulties with the interview subjects.

<sup>9</sup> The information contained in this table was derived from the mail responses form rather than questions asked during the telephone interview.

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**Table 4: Police Officer Respondent Title (Q2)**

| Title                 | Number    | Percent    |
|-----------------------|-----------|------------|
| Assistant Chief       | 1         | 1          |
| Captain               | 5         | 6          |
| Chief                 | 3         | 4          |
| Commander             | 1         | 1          |
| Detective             | 28        | 34         |
| Detective Lieutenant  | 2         | 2          |
| Detective Sergeant    | 15        | 19         |
| Investigator          | 4         | 5          |
| Investigator Sergeant | 1         | 1          |
| Lieutenant            | 12        | 15         |
| Major                 | 2         | 2          |
| Sergeant              | 7         | 9          |
| <b>Total</b>          | <b>81</b> | <b>100</b> |

The titles indicate that the majority of CVSA practitioners are experienced police officers who have been active long enough to have achieved higher rank within their respective departments.

Table 5 provides a summary of the experience (measured in years) of the police officers responding to the survey. This data confirms that the respondents to the survey are an experienced group of police officers. Their experience ranged from a low of 3 years to a maximum of 34 years with a mean value of 18.48 years. Their experience with CVSA ranged from a low of 1 year to a maximum of 17 years with a mean value of 6.17 years. Finally, the estimated total number of CVSA exams they personally conducted during their careers ranged from a low of 10 examinations to a maximum of 1,000 examinations. The mean value was 180 examinations. **The total number of estimated career CVSA examinations reported by the 81 survey respondents was 14,629 examinations.**

**Table 5: CVSA Experience of Police Officer Respondents**

|  |                | Years Police Officer (Q3) | CVSA Experience Years (Q21) | CVSA Career Exams (Q22) |
|--|----------------|---------------------------|-----------------------------|-------------------------|
| <b>N</b>   | <b>Valid</b>   | 81                        | 81                          | 81                      |
|  | <b>Missing</b> | 0                         | 0                           | 0                       |
| <b>Mean</b>  |                | 18.48                     | 6.17                        | 180.60                  |
| <b>Median</b>  |                | 19.00                     | 6.00                        | 130.00                  |
| <b>Mode*</b>   |                | 12                        | 6                           | 100(a)                  |
| <b>Range</b>   |                | 32                        | 16                          | 990                     |
| <b>Minimum</b>   |                | 3                         | 1                           | 10                      |
| <b>Maximum</b>   |                | 34                        | 17                          | 1,000                   |
| <b>Sum</b>   |                | <b>1,497</b>              | <b>500</b>                  | <b>14,629</b>           |
| <i>*Multiple modes exist. The smallest value is shown.</i> |                |                           |                             |                         |

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Table 6 provides insight into the effectiveness of the initial training that the respondents received to conduct CVSA examinations (survey question 8 – Q8). All of the training was provided by NITV, the CVSA manufacturer. Possible responses to this question included “not effective,” “slightly effective,” “moderately effective,” “very effective,” and “extremely effective.”

**Table 6: Response to Question Characterizing Effectiveness of Initial CVSA Training (Q8)**

|              |                             | Frequency | Percent |
|--------------|-----------------------------|-----------|---------|
| <b>Valid</b> | <b>Moderately Effective</b> | 13        | 16      |
|              | <b>Very Effective</b>       | 38        | 47      |
|              | <b>Extremely Effective</b>  | 30        | 37      |
|              | <b>Total</b>                | 81        | 100.0   |

As the table shows, 68 of the respondents (84 percent) believed that their initial training from NITV had been either “very” or “extremely” effective. None of the respondents characterized their training as “not effective” or “slightly effective.”

The respondents were also asked how prepared they were to conduct CVSA examinations once they had completed their initial training (survey question 9 – Q9). Table 7 displays the results.

**Table 7: Response to Question Concerning Preparedness to Conduct CVSA Exams after Initial Training (Q9)**

|                |                            | Frequency | Percent |
|----------------|----------------------------|-----------|---------|
| <b>Valid</b>   | <b>Slightly Prepared</b>   | 1         | 1       |
|                | <b>Moderately Prepared</b> | 24        | 30      |
|                | <b>Very Prepared</b>       | 50        | 62      |
|                | <b>Extremely Prepared</b>  | 5         | 6       |
|                | <b>Total</b>               | 80        | 99      |
| <b>Missing</b> | <b>System</b>              | 1         | 1       |
| <b>Total</b>   |                            | 81        | 100     |

For those respondents who stated that they were only slightly or moderately prepared, the majority indicated that they did not have sufficient CVSA experience (23 out of 25 respondents) while two respondents said they had limited computer experience. All stated that as they gained CVSA experience, they became much more comfortable conducting CVSA examinations.

Respondents were also asked if they had received additional recertification training for CVSA (survey question 12 – Q12). (NITV recommends that CVSA examiners receive additional training at least once every three years.) Table 8 shows that approximately 70 percent of the respondents had completed recurrency training in the last 4 years while 30 percent had not.

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**Table 8: CVSA Recurrency Training (Q12)**

|              |               | Frequency | Percent |
|--------------|---------------|-----------|---------|
| <b>Valid</b> | <b>1 Year</b> | 9         | 11      |
|              | <b>2 Year</b> | 26        | 32      |
|              | <b>3 Year</b> | 17        | 21      |
|              | <b>4 Year</b> | 5         | 6       |
|              | <b>None</b>   | 24        | 30      |
| <b>Total</b> |               | 81        | 100     |

The respondents were asked if they had received any training in deception detection devices or technologies other than CVSA (survey question 15 – Q15). All responded, “No.” One respondent did say that he had oversight responsibility for their department’s polygraph examiners.

All of the respondents indicated they had received additional training in interrogation techniques not associated with the application of CVSA examinations (survey question 18 – Q18). Table 9 presents the types of interrogation training the survey respondents received.

**Table 9: Most Recent Type of non-CVSA Interrogation Training (Q18)**

|  | Frequency | Percent          |
|--|-----------|------------------|
| <b>Reid, other</b>                             | 29        | 36               |
| <b>Reid</b>                                    | 22        | 27               |
| <b>Other</b>                                   | 16        | 20               |
| <b>Departmental</b>                            | 3         | 4                |
| <b>Body kinesic</b>                            | 2         | 2                |
| <b>Glen Foster</b>                             | 2         | 2                |
| <b>Reid, Glen Foster</b>                       | 2         | 2                |
| <b>Can't remember</b>                          | 1         | 1                |
| <b>Other, state based</b>                      | 1         | 1                |
| <b>Reid and cognitive interview techniques</b> | 1         | 1                |
| <b>Reid, kinesic</b>                           | 1         | 1                |
| <b>Standard interviewing techniques</b>        | 1         | 1                |
| <b>Total</b>                                   | 81        | 98 <sup>10</sup> |

Sixty-three (63) of the respondents reported that they had received Reid interrogation and interview training. The category “other” was the next most common response with 16 responses. Many of the respondents chose this response because they couldn’t remember who provided the training. Most of the survey respondents had received this training numerous years in the past.

<sup>10</sup> Percentage does not equal 100% due to rounding.

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**CVSA Experience**

The following figures and tables summarize the respondents’ experience with CVSA examinations.

Question 23 in the survey asked how many past examinations the examiner personally conducted of pre-recorded examinations (also called covert examinations in the CVSA community). Table 10 shows that this type of examination was uncommon among the survey respondents. Fourteen (14) of the 81 respondents had done at least one covert examination in their career; however, the total number of career covert examinations conducted by this group totaled only 44. This represents 0.3 percent of all CVSA career examinations reported by the survey respondents (See Table 5). None of the respondents had done a covert examination in the last 12 months.

**Table 10: CVSA Covert Examinations (Q23)**

| <b>Number of Career Covert Exams Reported</b> | <b>Number of CVSA Examiners</b> | <b>Percent</b> |
|---|---------------------------------|----------------|
| 0   | 67                              | 83             |
| 1   | 3                               | 4              |
| 2   | 4                               | 5              |
| 3   | 4                               | 5              |
| 5   | 1                               | 1              |
| 6   | 1                               | 1              |
| 10  | 1                               | 1              |
| <b>Total</b>                                  | <b>81</b>                       | <b>100</b>     |

If a respondent had not conducted covert examinations, he or she was asked why (Question 23d). Most of the respondents stated that they did not know. Those that did provide a reason said that it was either illegal in their state (4 respondents) or they had no need (5 respondents). They were also asked how well covert examinations worked (survey question 23c – Q23c). Table 11 provides their responses.

**Table 11: General Comments on Covert Examinations (Q23c)**

|  | <b>Frequency</b> | <b>Percent</b>   |
|--|------------------|------------------|
| <b>Deception was detected</b>                            | 1                | 8                |
| <b>Easy to do</b>  | 1                | 8                |
| <b>It works okay</b>                                     | 3                | 25               |
| <b>Not as effective as being in person</b>               | 2                | 17               |
| <b>Okay but not great</b>                                | 1                | 8                |
| <b>Prefer not to do</b>                                  | 1                | 8                |
| <b>Worked okay, definitely need a good recording</b>     | 1                | 8                |
| <b>Works better in person</b>                            | 1                | 8                |
| <b>Works okay, you can only use for basic statements</b> | 1                | 8                |
| <b>Total</b>   | 12               | 98 <sup>11</sup> |

<sup>11</sup> Percentage does not equal 100% due to rounding.

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The results are somewhat ambiguous with respondents suggesting that covert CVSA examinations have limitations compared to CVSA examinations done in person.

The project team also asked respondents if they used CVSA for employee pre-employment screening and/or criminal investigations (survey questions 24 and 26, respectively). Forty three (43) (53 percent) of the respondents said they use CVSA for employee screening. All of the respondents said CVSA was used for criminal investigations.

Table 12 displays the responses to the questions regarding how many CVSA examinations each survey respondent had conducted in the last 12 months and in the last 30 days (survey questions 28 and 29, respectively – Q28 and Q29).

**Table 12: Number of CVSA Examinations in Last 12 Months and 30 Days**

|                |                | # CVSA in Last 12 Months (Q28) | # CVSA in Last 30 Days (Q29) |
|----------------|----------------|--------------------------------|------------------------------|
| <b>N</b>       | <b>Valid</b>   | 79                             | 60                           |
|                | <b>Missing</b> | 2                              | 21                           |
| <b>Mean</b>    |                | 35.27                          | 3.85                         |
| <b>Median</b>  |                | 30.00                          | 3.00                         |
| <b>Mode</b>    |                | 30                             | 2                            |
| <b>Range</b>   |                | 126                            | 11                           |
| <b>Minimum</b> |                | 4                              | 1                            |
| <b>Maximum</b> |                | 130                            | 12                           |
| <b>Sum</b>     |                | 2,786                          | 231                          |

The mean number of examinations was approximately 35 for the last 12 months with a range of 4 to 130. The survey respondents reported that they completed 2,786 CVSA examinations during the last 12 months. The mean number of reported CVSA examinations conducted in the last 30 days was 3.85. The associated range was 1 to 12. Survey respondents reported that they completed 231 CVSA examinations during the last 30 days.

The respondents were also asked to provide their opinion about the accuracy of CVSA in detecting stress (survey question 30 – Q30). The project staff provided the respondents with five possible answers to this question:

- Not Accurate
- Slightly Accurate
- Moderately Accurate
- Very Accurate
- Extremely Accurate

Table 13 provides the results of the respondents' responses to this question

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Table 13: CVSA Stress Accuracy (Q30)

|                     | Frequency | Percent |
|---------------------|-----------|---------|
| Slightly Accurate   | 3         | 4       |
| Moderately Accurate | 7         | 9       |
| Very Accurate       | 47        | 58      |
| Extremely Accurate  | 23        | 28      |
| No Response         | 1         | 1       |
| <b>Total</b>        | 81        | 100.0   |

Approximately 86 percent of the survey respondents indicated that they thought CVSA was either “Very” or “Extremely” accurate in detecting stress. The project staff then asked each respondent why he or she chose that particular response (survey question 31 – Q31). This was an open-ended question designed to elicit the rationale on why the respondents assessed CVSA’s stress accuracy the way they did. Table 14 provides a summary of these responses after the project staff categorized them. (The actual comments are included in Attachment 5).<sup>12</sup> The table also contains a brief description of each accuracy reason category.

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<sup>12</sup> While 80 respondents provided an answer, the total number of responses in Table 14 is greater than 81 (number of total respondents in this study) because a number of the respondents provided more than one reason for their accuracy assessment (the responses were categorized and then aggregated for display in this table).

Table 14: Stress Deception Accuracy

| Accuracy Reason Category Summary | Count      | Percent    |
|----------------------------------|------------|------------|
| Experience                       | 30         | 28         |
| Interviewer skill                | 20         | 19         |
| Not 100%                         | 14         | 13         |
| Just tool                        | 10         | 9          |
| Detects stress                   | 7          | 7          |
| Intimidation                     | 6          | 6          |
| Success                          | 4          | 4          |
| Good tool                        | 2          | 2          |
| Helps detect deception           | 2          | 2          |
| Not convinced                    | 2          | 2          |
| Reliable                         | 2          | 2          |
| Training                         | 2          | 2          |
| Confession                       | 2          | 2          |
| No Response                      | 1          | 1          |
| Accurate as polygraph            | 1          | 1          |
| 99% positive                     | 1          | 1          |
| Seen stress errors               | 1          | 1          |
| <b>Total</b>                     | <b>107</b> | <b>100</b> |

- **Experience:** This relates to the investigator’s personal experience with the results from the exam; many examples were provided
- **Interviewer Skill:** This relates to the opinion that interview skill is central to CVSA success
- **Not 100%:** Response indicating that CVSA does not always detect stress or doesn’t work in all situations
- **Just a Tool:** Comment that highlights the opinion that the CVSA is just another tool used in investigations
- **Detects Stress:** Comment supporting stress detection ability of CVSA
- **Intimidation:** Termed used in this report to denote the desirability of convincing CVSA exam subjects that the CVSA is accurate at detecting stress and deception
- **Success:** Relates to identifying deception through the CVSA examination process, not just machine indication of stress
- **Good Tool:** Self explanatory
- **Helps Detect Deception:** Self explanatory
- **No convinced:** Self explanatory
- **Reliable:** Works consistently
- **Training:** Training is key to successful use of the CVSA
- **Confession:** Experience with confessions lead to opinion
- **Accurate as Polygraph:** Self explanatory
- **99% Positive:** Works almost all the time
- **Seen Stress Errors:** Examiners has experience CVSA errors.

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The most commonly cited reason (29 percent) by the survey respondents was their personal experience. The second most common response referenced the interviewer’s skill level (19 percent), while another 22 percent offered the opinion that CVSA was “just a tool” and “not 100%” accurate.

The responses to the question about stress detection accuracy suggest that CVSA is very effective at detecting stress. However, 22 percent of these same respondents also qualified this statement by pointing out that CVSA is “not 100%” (inferring that it was not always accurate), and that it is “just a tool” (inferring that it is just one additional tool at their disposal). This apparent contradiction in results is addressed further in the *Discussion* section of this report.

**Basic Examination Procedures**

Questions 32, 33, and 34 asked the each survey respondent to describe the process he or she follows when conducting a CVSA examination. Specifically, they were asked to describe how they prepare (Question 32), how they conduct the examination (Question 33), and their typical post-examination actions (Question 34).

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All of the respondents indicated they followed the recommended protocol they learned in their NITV training. The procedures encompass three areas.

### **Pre-Interview Procedures**

CVSA examiners usually begin their preparation for a CVSA exam by familiarizing themselves with the facts associated with the criminal case. (This step is not necessary if the CVSA examiner is also handling the case). This familiarization usually includes discussing the case with the investigating police officer and reviewing appropriate documentation.

Once the examiner understands the basic facts surrounding the case, he or she begins to develop an idea of what types of questions to ask the interview subject. Then the examiner will typically do a pre-examination interview with the subject to explain what the CVSA is, how effective it is, and how the examination will be conducted. The examiner also discusses the subject's rights and addresses other issues as appropriate. This process is almost always done with just the examiner and the interview subject being present so that the examiner can begin to build a rapport with the subject. The goal at this point in the preparation process is to get the interview subject relaxed to enhance the possibility that the CVSA will detect deception-based stress.

Once the preliminary introduction process is complete, the examiner begins to develop the questions that will be used during the examination. The resulting questions are then reviewed and revised with the interview subject to make sure the questions are understood and that the interview subject will be fully aware of what questions will be asked. This process can take anywhere from 30 minutes to an hour. Each examination will include some control questions where the interview subject is asked to provide a false response. Once the examiner and the interview subject are comfortable with all the questions, the examination begins.

### **Examination Procedures**

Examinations are very straightforward. Usually the examiner will conduct the CVSA interview twice. The first run is considered a "dry run." After this is completed, the examiner can ask about any deception that might have been noted and the interview subject is given an opportunity to comment on the deception or ask about any other aspect of the examination. The examiner then conducts the second run.

### **Post-Examination Procedures**

Once the examination is complete, the majority of the examiners said they would have another examiner conduct a "cold call" review of the CVSA tape and offer his or her interpretation of the results. After this, the examiner would share the results of the CVSA examination with the police officer handling the case. If deception was indicated, usually the officer would then meet with the CVSA interview subject and conduct an interrogation. Only one examiner cited the adjunct use of the polygraph where CVSA had been used. In this case, the CVSA examination did not indicate deception but the investigator was not convinced and ordered a polygraph examination.

### **CVSA Results**

Question 35 asked the respondents how many times in the last 30 days had they detected deception. Question 36 asked how many times this deception was verified by other sources. Table 15 provides a summary of the survey respondents' experience with detecting deception and verifying that deception

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using CVSA. The respondents were asked to address this topic based on CVSA examinations they had conducted during the 30 days prior to being interviewed for this study.<sup>13</sup>

**Table 15: CVSA Exams Conducted During Last 30 Days, Number of Deceptions, and Number of Deceptions Verified**

|                |                | # CVSA in Last 30 Days (Q29) | Deception in Last 30 Days (Q35) | Deception Verified (Q36) |
|----------------|----------------|------------------------------|---------------------------------|--------------------------|
| <b>N</b>       | <b>Valid</b>   | 60                           | 53                              | 53                       |
|                | <b>Missing</b> | 21                           | 28                              | 28                       |
| <b>Mean</b>    |                | 3.85                         | 1.89                            | 1.21                     |
| <b>Median</b>  |                | 3.00                         | 1.00                            | 1.00                     |
| <b>Mode</b>    |                | 2                            | 1                               | 1                        |
| <b>Range</b>   |                | 11                           | 8                               | 6                        |
| <b>Minimum</b> |                | 1                            | 0                               | 0                        |
| <b>Maximum</b> |                | 12                           | 8                               | 6                        |
| <b>Sum</b>     |                | 231                          | 100                             | 64                       |

As shown in the table, there were 231 total CVSA examinations conducted by 60 respondents during the 30 days prior to the survey. Of these, 100 CVSA examinations resulted in deception being detected (a 43 percent deception rate). Sixty-four (64) of the 100 examinations that had indications of deception were subsequently verified by other sources. The fact that 36 of the CVSA examinations where deception indications were present but not verified does not necessarily mean that there were no valid deception indications. Rather, it means that there was not enough verifying information available in those cases.

The respondents who indicated that at least one of their CVSA deception indications had been verified were asked to describe the verification source (survey question 37 – Q37). Table 16 provides a summary of their responses. The survey respondents reported that 75 percent of the CVSA deception indications were verified by obtaining a confession (or an admission if it was a screening test) from the examination subject. Less common verification sources included evidence and witnesses statements (22 percent combined).

**Table 16: Deception Verification Source (Q37)**

| Type Verification  | Number | Percentage |
|--|--------|------------|
| <b>Confession</b>  | 46     | 75         |
| <b>Evidence</b>  | 7      | 12         |
| <b>Witness</b>   | 6      | 10         |
| <b>Other Sources</b>   | 2      | 3          |
| <b>Total*</b>  | 61     | 100        |
| <i>*The total exceeds the 53 verified deceptions since some respondents provided more than one verification source.)</i> |        |            |

<sup>13</sup> A column summarizing the number of total CVSA examinations conducted during the prior 30 days is also included for comparison.

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This is an interesting statistic since confessions can occur any time during a CVSA examination. They can occur before the examination begins, during the examination itself, and after the examination ends. It is unclear if respondents answering this question were referring to all forms of confession (pre-test, during-test, or post-test) or just some portion thereof. Pre-test confessions are not a verification of the CVSA since no deception indications were provided.

Survey question 38 (Q38) addressed this issue. The question asked of the survey respondents was how often they believed that they received a confession when a CVSA examination resulted in a deception indication. Table 17 depicts the results showing that the mean response was 57 percent.

**Table 17: Percentage of Deception Confessions (Q38)**

|                |                |       |
|----------------|----------------|-------|
| <b>N</b>       | <b>Valid</b>   | 70    |
|                | <b>Missing</b> | 11    |
| <b>Mean</b>    |                | 57.00 |
| <b>Median</b>  |                | 50.00 |
| <b>Mode</b>    |                | 50    |
| <b>Range</b>   |                | 80    |
| <b>Minimum</b> |                | 20    |
| <b>Maximum</b> |                | 100   |

Question 39 asked the respondents how often they had their CVSA results verified by having another trained CVSA examiner review their results (sometimes called a “cold call”). This is the procedure recommended by NITV. Possible responses for this question included “always,” “usually,” “sometimes,” and “never.” Table 18 provides a summary of the answers to this question. As shown in the table, approximately 90 percent of the CVSA examiners conduct a cold call “usually” or “always.”

**Table 18: Cold Call Frequency (Q39)**

|                  | <b>Frequency</b> | <b>Percent</b> |
|------------------|------------------|----------------|
| <b>Never</b>     | 1                | 1.2            |
| <b>Sometimes</b> | 8                | 9.9            |
| <b>Usually</b>   | 16               | 19.8           |
| <b>Always</b>    | 56               | 69.1           |
| <b>Total</b>     | 81               | 100.0          |

The project staff also asked the survey respondents a follow-up question concerning the “cold call” interpretation of the CVSA tapes generated by the computer during the interview (survey question 40 – Q40). The staff asked the respondents how often there was a disagreement in the interpretation of the tapes during the “cold call.” Table 19 shows that disagreement was uncommon with only 7 percent of the “cold calls” having any disagreement with the original examiner’s assessment.

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**Table 19: Percentage of Cold Call Disagreement (Q40)**

|                |                |      |
|----------------|----------------|------|
| <b>N</b>       | <b>Valid</b>   | 72   |
|                | <b>Missing</b> | 9    |
| <b>Mean</b>    |                | 6.80 |
| <b>Median</b>  |                | 5.00 |
| <b>Mode</b>    |                | 10   |
| <b>Range</b>   |                | 50   |
| <b>Minimum</b> |                | 0    |
| <b>Maximum</b> |                | 50   |

It should be noted that a number of the survey respondents indicated that “cold call” disagreements were more common with less experienced examiners. Furthermore, the respondents indicated that the “cold call” disagreements usually centered on only one or two questions. If the police officers could not come to an agreement on a “cold call,” they often would send the tape to NITV and ask for a third-party interpretation.

Survey questions 41 and 42 (Q41a and Q42a) asked the respondents how often they experienced either false negative (subject guilty but not deceptive on CVSA examination) or false positive (subject innocent but shown deceptive on the CVSA examination) results. Table 20 provides a summary of the answers to this question.

**Table 20: False Negative and Positive Results (Q 41a and 42a)**

|                |                | <b>False Negative (Q41a)</b> | <b>False Positive (Q42a)</b> |
|----------------|----------------|------------------------------|------------------------------|
| <b>N</b>       | <b>Valid</b>   | 15                           | 19                           |
|                | <b>Missing</b> | 66                           | 62                           |
| <b>Mean</b>    |                | 1.13                         | 2.00                         |
| <b>Median</b>  |                | 1.00                         | 1.00                         |
| <b>Mode</b>    |                | 1                            | 1                            |
| <b>Range</b>   |                | 4                            | 6                            |
| <b>Minimum</b> |                | 0                            | 1                            |
| <b>Maximum</b> |                | 4                            | 7                            |
| <b>Sum</b>     |                | 17                           | 38                           |

The tables demonstrates that false negative and false positive errors occur infrequently, with only 15 respondents reporting a false negative and 19 reporting a false positive at least once in their career. This is a remarkably low error rate.

Survey question 43 (Q43) asked the respondents how important the interrogation technique was to the successful use of the CVSA. They were given five possible answers – “not important,” “slightly important,” “moderately important,” “very important,” or “extremely important.” Table 21 summarizes their responses. Fully 95 percent of the survey respondents believe that the technique employed by the interrogator is either “very important” or “extremely important.”

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**Table 21: Interrogator Technique Importance (Q43)**

|              |                             | Frequency | Percent |
|--------------|-----------------------------|-----------|---------|
| <b>Valid</b> | <b>Moderately Important</b> | 4         | 4.9     |
|              | <b>Very Important</b>       | 29        | 35.8    |
|              | <b>Extremely Important</b>  | 48        | 59.3    |
|              | <b>Total</b>                | 81        | 100.0   |

The project staff asked a follow-up question to determine why the survey respondents chose their response to Question 43 concerning interrogator importance. The responses can be found in Attachment 6. As before, the project staff reviewed and categorized these comments for ease of analysis. Table 22 provides a summary of the categories associated with the respondents’ rationale for their assessment of CVSA interrogator importance.

**Table 22: Comments Regarding Interrogator Importance**

|                                 | Total | Percent |
|---------------------------------|-------|---------|
| <b>Interrogator</b>             | 54    | 50      |
| <b>No response</b>              | 15    | 14      |
| <b>Just tool</b>                | 7     | 6       |
| <b>Not reliable</b>             | 7     | 6       |
| <b>Good tool</b>                | 6     | 6       |
| <b>Confession</b>               | 3     | 3       |
| <b>Interrogator and machine</b> | 3     | 3       |
| <b>Reliable</b>                 | 2     | 2       |
| <b>Preparation</b>              | 2     | 2       |
| <b>Easy</b>                     | 2     | 2       |
| <b>Stress reduction</b>         | 2     | 2       |
| <b>Quick</b>                    | 1     | 1       |
| <b>Not 100%</b>                 | 1     | 1       |
| <b>Accurate</b>                 | 1     | 1       |
| <b>Limited stress</b>           | 1     | 1       |
| <b>Simple</b>                   | 1     | 1       |
| <b>Total</b>                    | 108   | 100     |

- **Interrogator:** This relates to the opinion that interrogator’s interview skill is central to CVSA success
- **No Comment:** Self explanatory
- **Just tool:** Comment that highlights the opinion that the CVSA is just another tool used in investigations
- **Not reliable:** Opinion that the tool provides unreliable results.
- **Good tool:** Self explanatory
- **Confession:** Helps elicit confessions
- **Interrogator and machine:** Opinion that two cannot be separated
- **Reliable:** Provides consistent results
- **Preparation:** Opinion that good preparation is essential for success.
- **Easy:** Easy to use
- **Stress reduction:** Reduced stress in subject key to success
- **Quick:** Self explanatory
- **Not 100%:** Not always accurate
- **Accurate:** Always accurate
- **Limited Stress:** For subjects

Sixty-six (66) of the respondents answered this question although the total number of comments exceeded 81 (the number of survey participants) because many respondents offered numerous reasons regarding interrogator importance.

Of note, half the respondents cited the investigator as being central to the effectiveness of the CVSA examination process. The next most common response was “no comment.” This was surprising and seemed to be associated with a subset of the survey respondents who were suspicious of the survey’s purpose and how the results would be used. This response, at least for some of the survey respondents,

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appears to be related to the perceived conflict between the polygraph and CVSA communities. This was cited by a number of respondents as a factor in their response.

Table 23 presents the results from survey question 45 (Q54), which asked the respondents what they liked most about CVSA. The results in Table 23 depict summary categories developed by the project staff to make analysis easier. Once again, the total number of responses is greater than 81 since many of the survey respondents provided more than one answer. The actual respondent comments are delineated in Attachment 7.

**Table 23: Characteristics Respondents Like About CVSA (Q45)**

| CVSA Like                | Total      | Percent    |
|--------------------------|------------|------------|
| Quick                    | 29         | 22         |
| Portable                 | 14         | 11         |
| Easy                     | 20         | 15         |
| Simple                   | 9          | 7          |
| Intimidation             | 9          | 7          |
| Good tool                | 6          | 5          |
| Inexpensive              | 5          | 4          |
| Just tool                | 5          | 4          |
| Interrogation assistance | 5          | 4          |
| Interrogator             | 2          | 2          |
| Limited stress           | 7          | 5          |
| Subject interaction      | 4          | 3          |
| Cost                     | 1          | 1          |
| Effective                | 3          | 2          |
| Nothing                  | 1          | 1          |
| Pre-employment           | 1          | 1          |
| Satisfied                | 1          | 1          |
| Flexible                 | 1          | 1          |
| Not 100%                 | 1          | 1          |
| Reliable                 | 1          | 1          |
| Victim Use               | 1          | 1          |
| Screening                | 1          | 1          |
| Training                 | 3          | 2          |
| <b>Total</b>             | <b>130</b> | <b>100</b> |

- **Quick:** Self explanatory
- **Portable:** Self explanatory
- **Easy:** Self explanatory
- **Intimidation:** Good for eliciting confessions
- **Simple:** Self explanatory
- **Good tool:** Self explanatory
- **Inexpensive:** Usually cited in comparison to polygraph
- **Just tool:** Comment that highlights the opinion that the CVSA is just another tool used in investigations
- **Interrogation assistance:** Helps investigator decide how to proceed in investigation
- **Interrogator:** Need for best interrogators for tool to be effective
- **Limited stress:** For interview subject
- **Subject interaction:** Subject involved in review of charts
- **Cost:** Expensive for recertification
- **Effective:** Good tool for investigations
- **Nothing:** Self explanatory
- **Pre-employment:** Good for pre-employment interviews
- **Satisfied:** Happy with the machine
- **Flexible:** Can be used in different situations
- **Not 100%:** Not always accurate
- **Reliable:** Provides consistent results
- **Victim use:** Can be used on victims with minimal stress
- **Screening:** Good screening applicants
- **Training:** Training from NITV is good

Similar to the survey’s other open-ended questions, the 130 comments received in response to question 45 were derived from answers provided by 80 of the 81 survey respondents. More than half the reasons cited were associated with ease of use and logistics. This includes quickness of application, portability, and ease of use (a total of 55 percent). Other notable responses included the intimidation factor, inexpensiveness of technology, and limited stress on the interview subject.

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Question 46 asked the survey respondents what they disliked about CVSA. Only 67 respondents answered this question. As before, the project staff reviewed and categorized the responses, which are depicted in Table 24. The actual respondent comments are tabulated in Attachment 8.

**Table 24: Characteristics Respondents Dislike About CVSA (Q46)**

| <b>Comment</b>      | <b>Number</b> | <b>Percent</b> |
|---------------------|---------------|----------------|
| <b>Charts</b>       | 17            | 25             |
| <b>Not 100%</b>     | 15            | 22             |
| <b>Nothing</b>      | 9             | 13             |
| <b>Interrogator</b> | 8             | 12             |
| <b>Cold call</b>    | 4             | 6              |
| <b>Computer</b>     | 4             | 6              |
| <b>Training</b>     | 4             | 6              |
| <b>Time</b>         | 3             | 4              |
| <b>Cost</b>         | 2             | 3              |
| <b>Politics</b>     | 2             | 3              |
| <b>NITV</b>         | 1             | 1              |
| <b>Total</b>        | 69            | 100            |

- **Charts:** Chart interpretation
- **Not 100%:** Not always accurate
- **Nothing:** Self explanatory
- **Interrogator:** Need for best interrogators for tool to be effective
- **Cold call:** Need for cold call
- **Computer:** Usually provided by less computer literate respondents
- **Training:** Need for recurrent training
- **Time:** It takes time
- **Cost:** Cost of machine and or training
- **Politics:** Conflict between polygraph and CVSA communities
- **NITV:** Manufacturer

A common complaint from the survey respondents was the difficulty associated with reading and interpreting the CVSA charts (25 percent). A number of respondents also complained that NITV had promised automated chart reading to help interpret the charts but this had not come to fruition. Over the course of the interviews, however, NITV released this CVSA software upgrade, and a number of survey respondents indicated they were planning on upgrading their system to incorporate this new feature. The other notable response was the opinion that CVSA results are not 100 percent accurate.

The last question of the survey asked the respondents if they had any additional comments they wanted to offer concerning CVSA. Only 55 respondents provided comments.

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**Table 25: Additional Comments Regarding CVSA**

| General Comments                | Count | Percent |
|---------------------------------|-------|---------|
| <b>Just a tool</b>              | 14    | 19      |
| <b>Good tool</b>                | 12    | 16      |
| <b>Interrogator</b>             | 11    | 15      |
| <b>Not 100%</b>                 | 10    | 14      |
| <b>Politics</b>                 | 6     | 8       |
| <b>Intimidation</b>             | 4     | 5       |
| <b>Don't use</b>                | 2     | 3       |
| <b>Interrogation assistance</b> | 2     | 3       |
| <b>Limited stress</b>           | 2     | 3       |
| <b>Polygraph accurate</b>       | 2     | 3       |
| <b>Support</b>                  | 2     | 3       |
| <b>Easy</b>                     | 1     | 1       |
| <b>Happy</b>                    | 1     | 1       |
| <b>No inconclusive</b>          | 1     | 1       |
| <b>Practice needed</b>          | 1     | 1       |
| <b>Sex Crimes</b>               | 1     | 1       |
| <b>Training</b>                 | 1     | 1       |
| <b>Works</b>                    | 1     | 1       |
|                                 | 74    | 100     |

- **Just tool:** Comment that highlights the opinion that the CVSA is just another tool used in investigations
- **Good tool:** Self explanatory
- **Interrogator:** Need for best interrogators for tool to be effective
- **Not 100%:** Not always accurate
- **Politics:** Conflict between polygraph and CVSA communities
- **Intimidation:** Good for eliciting confessions
- **Don't use;** Self explanatory
- **Interrogation assistance:** Helps investigator in deciding how to proceed in investigation
- **Limited stress:** For interview subject
- **Polygraph accurate:** Accurate as polygraph
- **Support:** Good manufacturer support
- **Easy:** Self explanatory
- **Happy:** Happy with CVSA
- **No inconclusive:** No inconclusive interview results
- **Practice needed:** Must stay current to remain effective
- **Sex crimes:** Good for victim interviews
- **Training:** Good training
- **Works:** Effective

Seventeen (17) of the respondents (23 percent) clearly had positive comments to offer about CVSA (“good tool,” “no inconclusive,” “accurate,” “happy,” “works”). Twenty-six (26) of the respondents (35 percent) offered comments that indicate that they were somewhat guarded about the reliability of CVSA (“less than 100%,” “just a tool,” “don’t use”).

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## Discussion

The original goal of this study was to assess the effectiveness of VSA technology, including its validity and reliability, by members of the United States Armed Forces in a military field environment. Unfortunately, DOD issued a general order during the early stages of this project instructing DOD interrogators to cease using VSA devices. The majority of DOD interrogators and practitioners using VSA were quickly redeployed and not available for interviews. Consequently, the project team chose an alternative approach where civilian law enforcement officials using CVSA technology were interviewed. While the environment for civilian police officers is much different than the military environment, the expectation was that obtaining insight concerning CVSA use in the civilian sector would prove beneficial for military decision makers.

Eighty-one (81) civilian police officers from 81 different police agencies were asked 47 questions concerning their experience with CVSA via a confidential telephone interview. This survey-based descriptive study summarizes their responses and provides insight into the CVSA operational experience of these officers. These 81 police officers are a small portion of the CVSA examiner workforce in the United States, but they do represent approximately 1,500 combined years of police experience with over 14,500 completed CVSA examinations.

### CVSA Accuracy

The majority of the survey respondents believe that CVSA is useful tool. The usefulness of the tool appears to be in its use as an additional tool to help with a specific subset of criminal cases and pre-employment screening. Specific observations supporting this conclusion are provided below.

### Stress Measurement Accuracy

As mentioned at the beginning of this report, the underlying principle associated with VSA is the concept that deception can be detected in micro tremors (due to some type of stress or anxiety) that appear in the voice of deceptive individuals. The majority of the survey respondents (86 percent) indicated that CVSA did a good job of detecting this type of stress (Question 30). A follow-up question (Question 31) asking why they held this opinion on stress measurement accuracy showed that 29 percent based their opinion on their experience with CVSA. Responses such as “Had them pass the test and it turns out to be true based on other sources” or “Personal experience, it surprised me” support these opinions on stress measurement accuracy.

There were, however, other responses to Question 31 that provided a slightly different perspective on the question of stress measurement accuracy. Nineteen (19) percent stated that interviewer skill was essential to success while 13 percent stated that the CVSA was not 100% accurate. These two comments were central themes throughout the study. More specifically, the survey respondents cited the need for experienced interviewers to be involved in the process because the vast majority of respondents (95 percent) believe that the techniques used by the CVSA examiner are either “very” or “extremely” important to the accuracy of CVSA results (Question 43).

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### Interviewer Skill Versus CVSA Machine Accuracy

This is perhaps the most important issue associated with understanding how accurate CVSA is in measuring stress and thereby detecting deception. This issue is presented early in this discussion since it appears to be central to differences in respondent opinions for the majority of the survey questions. The central question appears to be:

*Is CVSA effectiveness due to good interviewer technique, the ability of the machine to detect stress, or a combination of both factors?*

Nearly all of the respondents indicated that interviewer skill was paramount to CVSA success. The relevance of this appears to be manifested in two different interviewer mechanisms. The first is associated with who is trained to conduct CVSA examinations. A number of respondents indicated that NITV recommends that only skilled and experienced interviewers be trained in the use of CVSA. As explained by the survey respondents, the underlying rationale for this recommendation is the need for the examiner to be skilled in interviewing so as not to increase the stress of the interview subject during the interview. The ideal scenario for a CVSA interview appears to focus on minimizing situational stress on the interview subject so deception-based stress can be recognized and measured more easily by the CVSA machine. An experienced interviewer can help establish this type of interview environment.

The other comment that appeared consistently throughout the interviews was that without a skilled examiner using good interview techniques (and following NITV interview protocols), the CVSA examination process would not provide good results. As mentioned earlier, 95 percent of the respondents cited examiner skill as being important. Follow-up responses to Question 21 (contained in Attachment 6) offer the following additional insights:

- “About 80% of success depends on the interviewer”
- “Just a tool, interrogation technique central to success”
- “Interrogation technique is 70-80% of the process; need to make sure that they (interview subject) are not stressed so the machine can pick up stress associated with the question”

These comments seem to suggest that the real driver in successful CVSA interviews is not the machine measuring stress but the interviewer conducting a good interview with the machine being an adjunct part of the process. Unfortunately, the proportion of success that can be attributed to the interviewer versus the proportion attributed to the CVSA machine cannot be separated or discriminated easily based on the results of this study. All of the examiners appeared to be highly skilled in interviewing techniques. Furthermore, all had received significant training in interview and interrogation techniques separate from the training they received to conduct CVSA examinations. This issue is further complicated by the responses to the survey questions that provided insight into the CVSA machine’s ability to measure stress.

## ***Covert Examinations***

Question 23 asked how often covert CVSA examinations (using recordings of individuals) were conducted. This was exceedingly rare – survey respondents in the study group had only conducted 44 career CVSA covert examinations. This represents only 0.3 percent of the reported 14,629 CVSA career examinations conducted by this group. Nevertheless, covert examinations are of interest because they remove, theoretically, the influence of the examiner during an interview, thereby giving clearer insight into the CVSA machine’s ability to discriminate stress. When asked how well the covert examinations worked, responses were varied. Typical responses included:

- “Deception was detected”
- “Not as effective as conducting the CVSA in person”
- “Works okay”
- “Okay, but not great”
- “Definitely need a good recording”

Due to the small number of covert examinations conducted by the survey respondents, the experience of this sample of CVSA examiners cannot provide any real insight into the effectiveness of CVSA to detect stress without an interviewer present. Their responses suggest, however, that covert examinations are not as effective as in-person CVSA interviews. Since the most obvious difference between the covert and in-person CVSA examinations is the presence or absence of the CVSA interviewer, the role of the CVSA interviewer is crucial to the CVSA examination’s success.

## ***Confessions***

Many of the respondents indicated that they used the CVSA selectively and not very often and that the best outcome is obtaining a confession. The respondents in this study conducted, on average, 3 to 4 examinations per month. A number of respondents indicated they thought CVSA worked best for serious criminal cases due to the presence of increased jeopardy. Other survey respondents mentioned that they found the CVSA useful for victim interviews in sexual crime cases and also suitable for use with children.

It was not an uncommon observation for respondents to cite pre-CVSA interview confessions as being common, even desired. Thirteen respondents cited the CVSA “intimidation” factor as being important to soliciting confessions (Tables 23 and 25). Intimidation is a term used in this study to reference the desire cited by CVSA examiners to convince CVSA examination subjects that the CVSA is 100% accurate in “lie detection.”

This “intimidation factor” manifested itself in different ways. One respondent cited a 100% case clearance rate when he used the CVSA, which he attributed to the low education level of the interview subjects in his rural area. He attributed the high case clearance rate to the fact that the majority of suspects believed the CVSA could detect deception.

Another respondent referred to his community as being one characterized by high education and income. He opined that CVSA was not as effective in his environment due to potential interview subjects being aware that the CVSA examination was voluntary and therefore not a required part of the investigation process.

Approximately 75 percent of survey respondents indicated they received a confession from a subject (or an admission during pre-employment screening) when they told the interview subject that they had

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indicated deception on the CVSA examination (Question 38 and Table 17). Since CVSA examinations are voluntary, this is a very significant outcome and may be one reason that police officers interviewed for this project like the CVSA.

### ***Deception/Verification***

The project staff asked questions about deception detection and verification. These questions (Questions 35 and 36) were limited to the last 30 days in order to minimize the risk of recall errors. During the last 30 days, the average number of CVSA examinations conducted was 3.85. Deceptions were discovered in 1.89 (49 percent) of these CVSA examinations. Of these, 1.21 of the deceptions (64 percent) were verified by other sources. **The majority of these deceptions (75 percent) were verified by confessions (see Tables 15 and 16).** Less common verification sources included evidence and witnesses statements (22 percent combined).

A different picture emerged when respondents were asked in Question 38 how often they believed that they received a confession when a CVSA examination resulted in a deception indication. The average response was 57 percent of the time, 18 percent lower than the average response to the Question 36, which also asked about deception verification.

The difference between the responses to Questions 36 and 38 may be due to the fact that Question 36 is asking about deception the verification of deceptions detected experienced during the last 30 days while Question 38 is an estimate of lifetime experience.

### ***CVSA Errors***

**Survey participants' estimates of errors associated with CVSA (false negatives and false positives) were uncommon. The respondents reported that they had a total of 56 such career errors. This is an error rate of 0.4 percent for all career examinations conducted by this group.**

While this is an impressive statistic, it does not fully agree with the information provided by the respondents to other questions. Thirty six (36) of the 81 respondents provided comments indicating that CVSA is not highly reliable or 100 percent accurate.

While these statistics may appear to be in conflict, it is more likely they are reporting different perspectives. The comments about reliability and accuracy are opinions expressed in open-ended questions. These opinions are based on the police officers' experiences that probably do not include false positive or negative results.

The low number of false positive and negative results may be related to the CVSA process. CVSA examinations are voluntary and not admissible in court. Consequently, people showing deception who are not guilty (false positive) will not be convicted since additional evidence would be necessary for a conviction. These errors will not be discovered.

People who are guilty but show no deception on the CVSA (false negatives) are a different story. Those who are not convicted through other evidence will never be counted. These errors will not be discovered. There is no clear answer, therefore, regarding to how often CVSA examinations result in errors. It is probable that the CVSA errors reported in this report actually under-report the true number of these events.

***Benefits of CVSA***

It is clear that the majority of the survey respondents believe the CVSA is useful. Key factors in this usefulness appear to be ease of use, timeliness, affordability, and ability to help convince guilty subjects to confess. It appears to be very helpful in clearing cases. The majority of the respondents also believe the CVSA can measure stress.

The survey respondents' positive perception of the usefulness of CVSA is not surprising notwithstanding the CVSA machine's reported lack of 100% accuracy. These respondents reported a 75% confession rate when deception was indicated. This is a good outcome. It appears that the majority of these police officers use the CVSA as a tool to supplement other investigative techniques. It is not used in all cases, but rather in a specific subset of all cases where someone has determined that CVSA will prove to be of assistance.

## Conclusions

Based on the analysis contained in this study, there are three primary conclusions:

- The majority of the participants in this study believe that CVSA is a useful tool.
- The usefulness of the CVSA tool does not appear to be associated strongly with its ability to detect all deception.
- CVSA's utility is associated with its use as an additional tool to help with a specific subset of criminal cases and pre-employment screening.

Additional conclusions include the following:

- The majority of the police officers interviewed for this study like CVSA because it helps them clear cases.
- Police officers cite ease of use, portability, and timeliness as beneficial characteristics of CVSA.
- CVSA effectiveness is extremely dependant on interrogator skill.
- Following the interview protocol recommended by NITV is extremely important for success.
- Approximately 75 percent of all deception indications are verified by confessions.
- Approximately 44 percent of the survey respondents volunteered that CVSA is not 100 percent accurate.
- The best outcome from a CVSA interview among guilty subjects appears to be obtaining a confession.
- The majority of the survey respondents believe that CVSA appears to provide indications of stress.

Finally, it must be noted that quantitative measures of CVSA reliability or validity in detecting deception cannot be developed with any degree of dependability based on the findings of this survey.

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**Attachment 1**

**Letter of Introduction and Request for Participation**

Month, Day, Year

Police Officer Name  
Police Department Name  
Address 1  
Address 2  
City, State, Zip Code

Dear (Police Officer Rank and Name),

You have been identified by the National Institute for Truth Verification (NITV) as a point of contact for your department for questions concerning Computer Voice Stress Analysis (CVSA) a computer based truth verification system. Xxxx, a research company, has been asked by the Federal Government to evaluate the effectiveness of this technology in detecting deception. This research is part of our efforts to better understand truth deception technologies and their role in the continuing war on terror. A key part of this evaluation is learning from users of CVSA about their real-world experiences in detecting deception using CVSA.

We are writing to ask if you, or your CVSA colleagues at your department, would be willing to participate in a survey about your experience with CVSA. The survey will last 15 minutes or less and will deal primarily with the actual use of the CVSA in your environment. No questions will be asked concerning individual cases nor will any identifying information about the interview subjects or your department be collected. The results will be completely anonymous. We are only interested in the validity and reliability of the CVSA technology. The results from the survey will be analyzed and reported in the aggregate.

We are conducting these interviews via telephone. Enclosed with this letter is a self addressed envelope and response form which you can use to respond to our request. If you choose not to participate, please send the response form back so we can remove you from our list. You will receive no additional communications about this study. If you would like to participate, we will follow-up with you within two-four weeks to arrange for the interview.

We appreciate your consideration of our request. If you would like additional information about this study please contact me directly.

Sincerely,

Principal Investigator

Tracking Number = xxx

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**Attachment 2**

**Response Form**

**RESPONSE FORM**

**1) ARE YOU WILLING TO PARTICIPATE IN AN INTERVIEW ON CVSA? (Circle Appropriate Response)**

YES    NO    Call Me to Discuss Further

**2) IF YES, WHO IS THE CONTACT PERSON?**

Name: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email: \_\_\_\_\_

**3) BACKGROUND INFORMATION:**

- How many people on your staff are trained to use CVSA? \_\_\_\_\_
- How many actually conduct CVSA assessments? \_\_\_\_\_

**4) WE NOT WILLING TO PARTICIPATE BECAUSE: (Check Appropriate Response):**

- We no longer use CVSA: \_\_\_\_\_
- We use other deception detection technology: \_\_\_\_\_
- Of other reasons: \_\_\_\_\_

**5) ADDITIONAL COMMENTS:**

**TRACKING NUMBER = XXXX**

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**Attachment 3**

**Telephone Follow-up Interview Script for  
Invitation Package Non-Responders**

**DRAFT FOLLOW-UP SCRIPT**

My name is xxxx and I am helping with a research project for the Department of Defense designed to evaluate the effectiveness of Computer Voice Stress Analysis in detecting deception. You were listed on the website of the National Institute for Truth Verification (NITV) as a point of contact for CVSA. This research is part of our efforts to better understand truth deception technologies and their role in the continuing war on terror.

A letter was sent to you approximately a six weeks ago asking if you were be willing to participate in a short 10-15 minute interview about your experiences. I was calling to ask find out why you decided not to participate in the study? Any comments you might like to offer will be completely anonymous. It would be very helpful to know why you chose not to participate.

Thank you very much for your time.

Follow-up or contact information

Principal Investigator = (name and telephone number)  
Project Manager = (name and telephone number)

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**Attachment 4**

**CVSA Telephone Survey**

**CVSA Telephone Survey**

**Introduction**

**1. I would like to start by reading a short statement. My name is xxxx and I am the principal investigator for a research project that is evaluating computer voice stress analysis, also known as CVSA. The goal of this research is to learn about CVSA from experienced CVSA examiners such as you. This research is being conducted by the Department of Defense. The interview will take about 15-20 minutes to complete. No questions will be asked concerning individual cases nor will any identifying information about the interview subjects or your department be collected. The results will be completely anonymous. We are only interested in the effectiveness of the CVSA technology. The results from the survey will be analyzed and reported in the aggregate. You can refuse to answer any question and you can stop the interview at anytime. Are you willing to participate in this interview?**

- Yes
- No

**2. Ok, let me start by asking some questions about your background and training to used CVSA. What is your rank or position?**

**3. How long have your been a police officer?**

**4. Now I would like to ask you some questions about your initial training to conduct CVSA examinations. Did you receive formal classroom training in conducting CVSA examinations?**

- Yes
- No
- Refuse
- DK
- Other:

**5. Who conducted the training, was it?**

- NITV **(Skip to Q. 6)**
- Another CVSA examiner?
- A CVSA representative?
- Other:

**5a. What kind of training did you receive, would you say it was?**

- (Select only one.)
- On the job training? (Skip to Q. 18)
  - Self study? (Skip to Q. 21)
  - None?
  - Other?
  - Refuse?
  - DK?

**5b. Who conducted the training?**

**5c. How many hours did the training last?**

**6. How long ago did you receive this training?**

**7. Where was the training conducted?**

**8. How would you characterize the effectiveness of your initial training? Would you say it was**

- (Select only one.)**
- Not effective
  - Slightly effective
  - Moderately effective
  - Very effective
  - Extremely effective
  - Other:

**9. How prepared were you to conduct CVSA examinations when your initial training was completed, would you say you were**

- (Select only one.)**
- Not prepared
  - Slightly prepared
  - Moderately prepared
  - Very prepared **(Skip to Q. 12)**
  - Extremely prepared **(Skip to Q. 12)**
  - Other: **(Skip to Q. 12)**

10. Why were you not prepared?

11. What did you do to become prepared?

12. Have you received additional CVSA training since your primary training was completed?

(Select only one.)

- Yes
- No
- DK
- RF
- Other:

13. When was this additional training completed?

14. Please describe this training.

15. Have you received training in the use of other deception detection technologies such as polygraph?

(Select only one.)

- Yes
- No (Skip to Q. 17)
- RF (Skip to Q. 17)
- DK (Skip to Q. 17)
- Other: (Skip to Q. 17)

16. Which technologies?

17. Have you received training in deception detection interrogation techniques that was not associated with CVSA or polygraph?

- Yes
- No (Skip to Q. 21)
- RF (Skip to Q. 21)
- DK (Skip to Q. 21)
- Other: (Skip to Q. 21)

18. What type of training was this?

19. Who provided the training?

20. When did you receive the training?

CVSA EXAMINATION EXPERIENCE

21. I would now like to ask you some questions about your experience conducting CVSA examinations. How long have you been conducting CVSA examinations?

22. How many CVSA examinations would you estimate you conducted in your career?

23. How many of these CVSA examinations were of previously recorded interrogations sometimes called a covert examination?

(Select only one.)

- . 0 (Ask 23d)
- . > 0 Ask (Ask 23a,b,c)
- a) How many have you done in your career?
- b) How many have you done in the last 12 months?
- c) How well did the covert examinations work out?
- d) Why don't you do covert examinations?

24. Does your department use CVSA for employee screening?

(Select only one.)

- . Yes (Skip to Q. 26)
- . No
- . RF (Skip to Q. 26)
- . DK (Skip to Q. 26)
- . Other: (Skip to Q. 26)

25. Why not?

26. Does your department use CVSA for criminal investigations?

(Select only one.)

- . Yes
- . No
- . DK
- . RF
- . Other:

27. Why not?

28. How many CVSA examinations did you conduct during the last 12 months?

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**29. How many CVSA examinations did you conduct in the last 30 days?**

**30. How accurate would you say CVSA technology is in detecting stress? Would you say it is**

**(Select only one.)**

- . Not accurate
- . Slightly accurate
- . Moderately accurate
- . Very accurate
- . Extremely accurate
- . RF
- . DK

**31. Please tell me why you chose (option from above)?**

**CVSA Procedures**

**32. I am now going to ask you three questions about how you prepare for an examination, how you conduct the examination and what you do after an examination is completed. Let me start by asking your how you typically prepared for an examination when the interrogation subject was present.**

**33. Please describe how an examination was typically conducted when the interrogation subject was present.**

**34. Please describe what follow-up actions you typically took when you completed an CVSA examination when the interrogation subject was present.**

**35. How many of the x CVSA examinations you conducted during the last 30 days did you detect deception? (Skip to 38 if no examinations done in the last 30 days)**

**36. How many of these xx deception detections were verified by other sources?**

**37. What were these other sources?**

**38. How often do you obtain a confession when deception is indicated?**

**39. How often do you have a second person interpret the CVSA results tape which is also know as a "cold call"?**

**(Select only one.)**

- Always
- Usually
- Sometimes
- Never (Skip to Q. 41)
- Other:

**40. When cold calls are done, how often does the interpretation of the examination results differ from your original interpretation?**

**Final Questions**

**41. Have you ever had a subject pass the CVSA examination but later been found guilty of the charge (sometimes called a false negative result?)**

41a. How often has this occurred?

**42. Have you ever had a subject fail the examination but later been found innocent guilty of the charge (sometimes called a false positive result?)**

41b. How often has this occurred?

**43. In your opinion, how important is your interrogation technique to sucessful use of the CVSA? Would you say it is**

**(Select only one.)**

- Not important
- Slightly important
- Moderately important
- Very important
- Extremely important

**44. Why did you chose that response?**

**45. What do you like most about CVSA?**

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**46. What do you like least about CVSA?**

**47. Are there any additional comments or thoughts you would like to offer about CVSA technology or techniques?**

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**Attachment 5**

**Responses to Question 31  
(Why Did You Answer the Question about CVSA Accuracy the Way You Did?)**

| Accuracy Reasons Why  |
|---|
| Just a tool, accurate as polygraph  |
| Rural environment, uneducated population, 100 clearance rate  |
| No doubt that it picks up stress  |
| I think it detects stress, the key is the interviewer's ability to minimize stress  |
| Interviewer drives success  |
| It is just a tool, it is just a prop, if not a good interviewer, process won't work   |
| Base on personal experience with pre-employment testing   |
| Results track with what I feel about their truthfulness before the exam   |
| I've had good luck with it, You want validation of stuff that happened. Had them pass the test and it turns out to be true (from other sources).  |
| It has been accurate on a number of occasions, I have gotten a lot of confessions, no better or worse than any other device, just an investigative tool, CVSA is quicker than polygraph |
| It indicates stress which is associated with guilt, stress is real  |
| You can tell when a subject is lying, from observation you find correlation   |
| Based on personal experience  |
| Skilled examiner, good results, less skilled examiner less accurate results   |
| Base don my experience and results  |
| Experience  |
| It works in helping detect deception  |
| Did an internal investigation on drugs covering 50-60 employees. Four or five showed deception but were not involved. Still a good tool but not 100%                                    |
| You need to be very specific in developing your questions.  |
| A lot depends on the interviewer and the person you are interviewing. Best in controlled environment, Just the presence of CVSA machine can generate a confession                       |
| Not really sure about its ability to detect stress as deception   |
| I have had great success. We selectively employ it, just the display itself is enough to pus people into admission  |
| Depends on how you structure questions, depends on the environment, stress triggers based on the questions you ask  |
| It does pretty well but there have been a few cases when it didn't detect deception when it was there   |
| Based on experience, more effective in criminal cases, jeopardy required for it to be effective   |
| Personal experience, it surprised me  |
| Based on results, the stress in training coincides with what we see in the field, correlates with common sense  |
| No response   |
| Based on my personal experience   |

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|  |
|--|
| We know its not 100, the instrument does what it purports to do, it detects stress,  |
| Because there have been some where I expected stress but I didn't see it on the machine, usually can tell during pre-interview questioning.  |
| Based on experience  |
| If done correctly you get good results, if you have a indication from the machine, you need to dig deeper  |
| Don't believe in 100% accuracy, two cases where I called them not deceptive, but they were   |
| Only as good as the guy who is conducting the interview  |
| Depends on the subject and the quality of the interview and interviewer  |
| Well, it's a tool. I think if it is used correctly, it is good, otherwise it is only moderately effective  |
| Just a tool, convince them it is 100% accurate, remove stress,   |
| It picks up stress, based on experience,   |
| Question format is essential, just a tool you need to know how to operate it properly like a radar gun, need to make sure you ask the right questions, if you are not specific enough, questions will not work |
| As long as I have been giving the test we have not had any false negatives   |
| Usually can tell as soon as you hit them with original questions. They start show stress. Effective as a tool, you still need to go after the confession   |
| Works well if the interviewer manages the process  |
| Based on experience, if you are a good interviewer, the procedure works well   |
| I've had both criminal and pre-employment, stress in 90% of the deceptions, I can predict 95% of the results of cleared or confession before I conduct test.   |
| Training I have had and knowing facts about the case, its an exceptional tool  |
| If you do you DVRs right   |
| My basic experience has shown that 99% of the time we get positive follow-up from the process, never been proven wrong   |
| Based on my experience   |
| Works well but have seen stress not associated with crime  |
| Not a perfect tool, a victim and suspect perp both passed, also passed polygraph, under investigation  |
| Seen stress in person and seen it reflected in the CVSA results, other times no stress apparent but shows up in results  |
| It's a tool, we clear 70% of cases with the use of the tool, we want our best interrogators to use the tool.   |
| Based on my personal experience  |
| Based on experience  |
| It does detect stress, my experience   |
| Just a tool but works with an experienced examiner   |
| Results agree with other sources of information  |
| Personal experience  |
| My own experience, often get confessions from the machine  |
| Not 100% but a good tool that often gets a confession before the interview   |
| Experience and training,   |
| Depends on the subject and interviewer, can help get confessions   |
| Interrogator must manage the process for results to be valid   |

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| Personal experience   |
| Not a perfect process, poor interviewing can result in bad results.             |
| Remove subject stress and convince them that it works equals good results       |
| Experience and training,  |
| Experience  |
| A good tool   |
| Based on my experience  |
| Interviewer drives success  |
| Results track with other sources  |
| Interviewer is key to success   |
| There have been cases where we have stress detected but it is for other reasons |
| Experience  |
| Based on experience   |
| Not 100% but does help us in our interrogations                                 |
| Experience and training,  |

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**Attachment 6**

**Responses to Question 43  
(Why Did You Answer the Question about Interrogator Technique  
Importance the Way You Did?)**

| <b>Interrogator Comment</b>  |
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| Just a tool, interrogation technique central to success  |
| Good interviewers essential  |
| Only skilled interviewer should be involved, just an additional tool in the process, use CVSA as a supplement, can't use it in our department unless you are a first rate interrogator |
| Interviewing technique is central to CVSA success, we look at who the examiners are, don't want a strong command presence, essential to be neutral                                     |
| interrogator process key to the success, without confession you have nothing   |
| Try to narrow down questions, good interviewer is required   |
| Interrogation technique is 70-80% of the process. Need to make sure that they are not stressed so the machine can pick up stress associated with questions.                            |
| I think it is a process, a game of trying to get people to confess. You have to put in the time to make it an effective tool. You are trying to remove the defense barrier.            |
| Seldom get wrong of misleading results but the interrogator is key,  |
| Critical, Need to make sure the subject understands the questions and are focused.   |
| Good interviewer is key to success   |
| The CVSA by itself is not reliable, the key to its use is the interrogation  |
| Its the whole package, you cannot operate the CVSA in a vacuum, the interview process is central to the success  |
| Without the interviewer skill, the machine would be worthless  |
| I think you need your best of the best doing the exams, no inexperienced investigators   |
| Useful tool but it is just a tool.   |
| Interviewer most important part of process   |
| Chance of seeing stress = 0 without prep. Make subject comfortable and stress is more apparent.  |
| Some cases where it didn't detect deception  |
| Technique is number one issue, most important  |
| The machine and interview techniques are both important  |
| 80% of our success is due to interrogation techniques  |
| Good interrogation/interview essential   |
| Excellent tool in investigation, like it more in the criminal investigation, often get confessions, shows the stress   |
| About 80% of the success depends on the interviewer  |
| If you do not question them properly the test will not work  |
| Investigator must have the ability to understand why they are having stress.   |
| Combination of the CVSA and interviewer techniques a good combination  |
| Just a tool in the hands of the investigator   |
| Instrument is just a tool, just gives some indication of stress.   |
| If you do a good interview, you don't need CVSA  |
| Need an expert interviewer   |

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| Need outstanding interviewers, Need to build a good rapport with subject   |
| A good investigator with a shoe box (lie detector) can get confessions. Most important aspect. If you get bad results, its the investigators fault                             |
| Machine effectiveness cannot be separated from interviewing. Depend on each, machine contributes but you have to go after confession   |
| It is just a tool in the tool box, if you are not a good interviewer then you will not get good results  |
| Defense barrier removal, have to get people relaxed, treat them an innocent, looking for stress you need to send your best integrators to school, need to elicits confessions, |
| technique is central, a good interviewer is a must   |
| Ability to interview well in essential, preparation and protocol essential   |
| Interview techniques are very important, pre interview more important than post interview  |
| A good interviewer can get confessions before the test, it is not a lie detector   |
| Convenient and quick, no undetermined results, can discuss with subject and get confession   |
| interrogator skill is key to success   |
| Interrogator skill and preparation is essential  |
| Just a tool, the interrogator is important   |
| Questions must be done properly,   |
| Good tool with an experienced investigator   |
| You need to be prepared, to have your best investigators using the CVSA  |
| Confessions often come before the interview. Investigator preparation is important   |
| Seldom wrong with a good interrogator  |
| Try to narrow down questions, good interviewer is required   |
| Helps eliminate stress with the subject, essential for good results  |
| The interviewer makes all the difference.  |
| Useful tool in the hands of an experienced investigator  |
| The majority of our success is due to the interviewer technique  |
| Question preparation and execution is key to the success of this machine   |
| Need highly experience interviewers for the machine to work best.  |
| Poor interviewers get poor results   |
| Confessions often come before the interview. Investigator preparation is important   |
| Protocol and interview preparation is essential. Good tool if procedures are followed.   |
| Need to reduce stress with subject, good interviewer is important for this   |
| Machine shows stress if protocol followed  |
| The machine and interview techniques are both important  |

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Attachment 7

Responses to Question 45  
(What Do You Like Most about CVSA?)

| CVSA Like  |
|--|
| Availability, taped statements, less time  |
| Training is affordable   |
| Very good for pre-employment interviews  |
| Efficient, quick, can show the patterns to the subject   |
| Amount of success I have had. Sex crimes and homicide. Take people who would never admit, show them chart, ask for their interpretation of charts, easy to get confession never had to ask for DNA samples |
| Easy and quick   |
| Good interviewer is required   |
| Helps provide a narrowed field for focus, time is important can be done right now, don't have to train for 6 or more weeks like polygraph  |
| Would like a confession in 5 minutes, we are all pressed for time.   |
| Quick compared to polygraph, the whole process   |
| Its portable and easy to use   |
| Its a intimidating tool  |
| Ability to use on a variety of subjects, portability, not complex, can be used to clear people of things, we interview sex crime subjects  |
| Timely, simple to operator, training is comprehensive  |
| Readily available  |
| Simplicity compared to polygraph   |
| Very satisfied using the device  |
| Valuable tool, just one more tool, not magic   |
| Inexpensive, training reasonable, portable, great for pre-employment, good tool in aiding us in what we do   |
| Simple, portable, investigator friendly  |
| Portability  |
| Nothing, we are required to use it   |
| Quickness and ease, can do it right now, gives me a different approach to interrogation, more tools in the tool box, really complements the Reid process   |
| It is elimination device, good at screening, would put not 100% on results although it helps me decide where to go with a case   |
| Good tool in our tool belt, interviewing technique is important  |
| Simplicity, and portability  |
| Give a person a chance to have science, tools helps convince the subject to cooperate, people don't beat the machine,  |
| Proven effective, not a coin toss  |
| Not complex, its reliable if one sticks to the protocols, less intrusive   |
| Ease of use, price   |
| Its quick and immediate, correlates with polygraph, easy to use (digitalis harder than old analog)   |
| Portable and easy to use, can use on children and victims,   |

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| It encourages the investigator to go further  |
| Timely, user friendly, can be done quicker than polygraph   |
| Speed and limited stress on the subject   |
| It's a tool we can use just like a radar gun. It is perceived as a 'truth machine"  |
| A good tool, ties into psychology, helps develop confession   |
| Portable, quick response, it is just a tool   |
| Versatility, quick, not a lot of set up while polygraph needs weeks of advance notice   |
| Get a feel if they are telling the truth  |
| Drugs and intoxication don't influence results  |
| Its portable, quick accurate tool, just a tool that we use  |
| Easy to use, quick  |
| Ease of use, not invasive for subject   |
| Simple, ease of operation   |
| Portable, simple to operate, no operator interaction with the charts, interpretation is easy  |
| Great tool, convince them that it works, visual tool that they can see, quicker than the polygraph  |
| Affordable, portable, on site and ready to be used  |
| It is not threatening   |
| Timely, convenient  |
| It seems to work best with more serious charges   |
| Many will make admissions upfront before the examination, not intrusive, works well in pre-employment interviewing, good about detecting stress |
| Very good tool for investigation, its sharpens the investigator's focus, they accept results  |
| Portable, quick   |
| Quick and easy, can show patterns to subject  |
| Can often generate confession before interview is conducted.  |
| Easy to use, quick  |
| Portable, can be used on victims  |
| Quick   |
| Good tool, quick and cheap  |
| We use it a lot   |
| Helps provide guidance on where the investigator needs to go, relatively easy to use  |
| Simple and ease of operation  |
| Good at getting confessions, visual   |
| Not intimidating like the polygraph, cost   |
| Timely and easy   |
| Quick and simple  |
| Can work with subject to discuss responses to questions,  |
| Easy to use, quick  |
| Portable, quick to use  |
| Not difficult for the subjects, portable  |
| Good training,  |
| Not invasive, good tool to assist investigations  |
| Perception  |
| Nothing   |
| Simple, not invasive, quick   |
| Easy to use and interpret   |

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| Intimidation of subject, "truth machine" |
| Cost, quick, simple                      |
| Portable and quick                       |

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Attachment 8

Responses to Question 46  
(What Do You Like Least about CVSA?)

| CVSA Dislike  |
|---|
| Nothing   |
| Political considerations  |
| Subjectivity in reading the chart, not a lie detector   |
| There is some variability in the chart interpretation, rules seem to change in recurrent training, some of it is fine tuning, |
| Lack of portability   |
| Sometimes judgment does not agree with CVSA results; need to rely on the machine in these cases.                              |
| Can't expect a 100% success rate. You have to have good questions. I have a lot of faith in it.                               |
| Only as good as the interrogator  |
| Need to make sure the questions are phrased and developed correctly   |
| Nothing   |
| Cold call not always easy to do.  |
| Subjective, interpretation of charts  |
| Lack of definitive results, there is a lot of ambiguity   |
| False expectation of the equipment to be a magic box  |
| Takes time, tend to use it for more serious crimes.   |
| Chart reading can sometimes be difficult if you are out of practice.  |
| Not 100%, "it is only measuring stress", it checks only one element of stress   |
| It can be temperamental, need to keep your head about you, always need to be aware  |
| Still some grey areas in question interpretation  |
| Training is too condensed   |
| Wish it was 100% accurate   |
| Need to know what you are doing, it's a good tools, need to convince subject that it works, need to follow protocol           |
| Not the end all, there are unrealistic expectations of what it can do, the charts can be difficult to read sometimes.         |
| Peoples voices have an impact, females show different than males  |
| Difficulty in learning to read patterns.  |
| Training is sometimes a pain  |
| None  |
| Still learning every day. Need to make sure you are operating it right.   |
| Charts grading capability   |
| Cost and training requirements  |
| Nothing   |
| Computer related issues   |
| Nothing   |
| Nothing   |
| Cold call disagreements, we get lazy and have problems  |
| No scoring charts for tapes   |
| Charts are difficult to read  |

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| Sometimes difficult to interpret tape, upper end hard blocks easy while lower end blocks are less important |
| Cold calls are difficult  |
| Takes time  |
| Nothing   |
| Chart reading can be difficult  |
| Not 100% reliable   |
| Not 100% reliable   |
| Cold calls are difficult  |
| Training is expensive   |
| Computer related issues   |
| Charts  |
| Takes time  |
| No scoring software for charts  |
| Interviews need to be done properly   |
| Nothing   |
| Need to have good questions, cannot get lazy  |
| Political considerations between CVSA and polygraph   |
| Charting can be hard, cold call disagreements   |
| It is not as black and white as they tell you   |
| Computer is old   |
| None  |
| Charting  |
| Nothing   |

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Attachment 9

Responses to Question 47  
(Are There Any Additional Comments or Thoughts You Would Like to Offer About CVSA Technology or Techniques?)

|   |
|---|
| Comments  |
| Polygraph and CVSA are just tools; experience of investigator is most important aspect.   |
| Helpful in sex crimes cases since victims can be interviewed in low stress situation  |
| It should not totally supplant the investigator experience,, it is an effective tool  |
| Just as accurate as polygraph, much easier. User friendly   |
| It is all how you use it. Points me in the direction I want to go. It is just a tool. I have had success but a lot depends on user performance. A bad operator will result in bad tests.                                      |
| We are happy with technology  |
| A good tool but only as good as its operator.   |
| Can't say machine is flawed, often have disagreement between my interpretation and the CVSA machine, It is just a tool, not 100% reliable but useful  |
| Irritating war between polygraph and CVSA, both are valid tools, just different.  |
| Some agencies get frustrated with its performance, they need to be patient and practice it. Need to do it right.  |
| Its just another tool   |
| Saves you from chasing your tail, first five test run all resulted in a confession, the machine and environment is intimidating   |
| Need to get work out how effective it can be. You must ask proper questions and follow the proper protocol.   |
| This is just a tool.  |
| Good tool, it has helped a lot.   |
| Political aspects of the technology   |
| Unfortunately a lot of confusion about what it is supposed to do; opposition from polygraph industry.   |
| Just another tool in the tool box, Approximately 2-5% error   |
| It is a good investigative tool, Stress indication is not a lie indication. When failures occur it is usually associated with the investigator. It can cause a problem. The key is to investigate why stress is present.      |
| I don't believe its 100% but a good tool, useful as an interrogation tool, good for pre-employment screening,   |
| We live in upscale area, we deal with educated people, they are not intimidated by the CVSA. They know that the machine is not perfect. The less educated you are, the more likely they are to respond the interview process. |

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| Just a tool, people want it to do everything, it needs to be used as part of a larger exercise, still requires skill, not a lie detector machine, more of verification device, psychology of process very important. |
| Just a tool, polygraph should stop beating us up, just different approaches  |
| I think it is a great tool, effective, I think there is a place for both poly and CVSA). It has been a great tool for us.  |
| Product support has been good, I wish all departments would use the device.  |
| Needs to be done according to protocol, good tool, don't want to cut corners with tool   |
| When you are done, you never have an inconclusive  |
| One of the best investigative tools that I have ever had   |
| NITV support is good   |
| I'm impressed with it but its just a tool, experience and good investigative techniques still essential  |
| If we are not getting anywhere we use the CVSA   |
| None   |
| Just a tool, not always reliable   |
| It is as good as the interrogator  |
| Just a tool  |
| Helps provide guidance to the investigator, gives direction when we get stuck  |
| The politics are frustrating   |
| Helps generate confessions when other approaches fail  |
| We use the tool because it works for us.   |
| Just a tool but one that we often find useful.   |
| We like the tool it does show stress.  |
| Works well for us, the training can be expensive but you have to be recertified every three years  |
| User friendly, easier than polygraph   |
| Politics between polygraph and CVSA community frustrating.   |
| Just a tool that we use  |
| Helpful when we want to interview victims since it is not intrusive  |
| We like the tool but a lot of people don't believe in it.  |
| Not 100% but with preparation it is very useful  |