

# **PS 65 Overvote Issues**

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## Preface

During the 2010 general election, poll site PS 65 in Bronx County, which serves eight election districts, experienced a higher than normal rate of overvotes on one of the voting machines located at the poll site. The poll site in question had three optical scan voting machines (ES&S DS200) in use at that election, with all eight election districts configured on each unit. Voters were allowed to have their ballot scanned on any of the three machines in use at PS 65.

## Issue

Preliminary conversation and review prompted the Election Operations Team to determine that ballots which did not have overvotes marked by voters on them actually had such votes cast and recorded on one of the scanners in use at that poll site. These votes were termed 'phantom' votes, the cause of which would be the subject of on-site analysis by the State Board, the Bronx Board of Elections voting system team, and vendor representatives from ES and S.

## Background

The DS200 is a visible green light optical scanner. It functions by reflecting light off of the ballot as it passes through the read heads (top and bottom). The amount of reflected light is measured as an analog value, and converted to an 8 bit digital value. White reflects more than black so if the reflected light value is above a specific threshold value, that pixel is considered white. If it reflects below the threshold value, the pixel is considered black. A digital image is created with the black and white pixels. The digital image is then evaluated to locate the target areas. Each target area is evaluated for the number of black pixels and the recognition of black pixel patterns within the target area. If the pixel count is high enough or a black pixel pattern is identified in the target area, the target is considered marked, and a vote is recorded.

## Research

Staff from the NYSBOE Election Operations Unit visited the Bronx Borough Board of Elections on February 29, 2012, to investigate on site, the cause of the reportedly higher than normal overvotes. Staff met with the Bronx staff and received background information related to the voting machine, the poll site itself and related procedures. Once staff was versed on the situation, the group proceeded to the locked room where the unit is being stored. We burned memory sticks with the same election definition used in the 2010 election and began scanning ballots. Over the course of an hour and a half we continuously scanned 200 ballots in all orientations without any incident of a

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phantom overvote. It was then decided that this type of processing would not normally occur in a poll site, as voting takes place over a 16-hour day, so we decided to let the unit sit while we went to lunch. However, after about 20 minutes and further conversation, we decided that perhaps the lighting at the poll site had a negative effect on how the scanner performed, as some poll sites have better lighting than others. We used a “flashlight” application from a smart phone to augment lighting in the Board’s environment, and scanned additional ballots. The first ballot scanned correctly but on the second, third and fourth ballots we finally saw evidence of phantom overvotes. We then recessed for lunch, debating whether the problem was related to the reflection of the light or the system alternately heating up and sitting idle. Upon returning from lunch, we began scanning additional ballots but this time without the additional light from the “flashlight” application. The phantom votes still occurred on a regular basis. We used ballots actually cast in the election in question along with blank ballots from the same election. Even when casting the same blank ballots more than once, some would at times scan as a blank ballot, scan as a correctly marked ballot and scan with phantom overvotes.

In the interest of time, NYSBOE asked the Bronx BOE team if they would conduct an additional test the next day after the system was shut down and had sat idle, overnight. Bronx BOE agreed, and the next morning the Bronx BOE ran 100 ballots through the system. They reported that 2 over voted ballots, one of which they had the system return and then re-scan, the other was “cast-as-is”, were both accepted by the system without issue and tabulated correctly. The other 98 ballots scanned without any warning message being displayed, and were tabulated correctly.

### Vendor Analysis

At our second investigation session, ES&S engineers came on-site on April 4<sup>th</sup> to perform a complete examination of the unit in question. ES&S representatives were given all the background information before they began their examination of the unit. They started out by performing a checklist exam of the unit and noticed only that the read head appeared to have a slight mark on it. They then began scanning ballots and only received one false positive overvote within the first hour of scanning. They examined the ballot and felt that it was due to a slight offset of the timing marks. We assured them that the system would detect false positives on a regular basis once the unit has been on for at least 2 hours. After we hit the 2 hour mark the unit began misreading ballots on a regular basis. The ES & S team then cleaned the read head and re-calibrated the unit. We let the unit sit for 20 minutes to cool down then began scanning ballots until the scanner heated up and no misreads were subsequently detected.

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### Conclusion

It appears that the unit was out of calibration and when the unit heated up over a period of time, the scanned image was distorted and the system recorded votes that were not marked. As can be seen on the attached ballot there are several areas on the image that appear much darker than others. If the system is distorting the ovals on the ballot so that they appear darker than they should, the additional darkened area can be interpreted by the system as a marked oval.

The NYSBOE states in its procedures (as distributed to all boards) and reiterates here, that all counties using the ES&S optical scanner clean and calibrate each scanner as part of their pre-election test procedure. It is further recommended that all counties, regardless of voting system vendor should also put into place a procedure that would identify when a result tape appears to reflect numbers that seem out of the ordinary (i.e. high number of overvotes), and thus trigger the further review of the tape and/or system. This procedure could include a step that would then force the scanner with the anomaly to become an additional unit in the post-election 3% audit.