Safe Kids, Safe Schools: 
Evaluating the Use of Iris Recognition Technology 
in New Egypt, NJ

Executive Summary

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Executive Summary

Introduction

This executive summary describes the implementation and impact of iris recognition technology in three schools in Plumsted Township, New Jersey. In September 2002, the Plumsted Township School District received a federal grant in the amount of $293,360 from the National Institute of Justice’s Office of Science and Technology to purchase and deploy iris recognition technology in its three schools: New Egypt Elementary School (NEES), New Egypt Middle School (NEMS), and New Egypt High School (NEHS). The project was named T-PASS: Teacher-Parent Authorization Security System.

Plumsted Township’s Board of Education partnered with New Jersey Business Systems of Robbinsville, NJ, an authorized New Jersey state contract vendor, to develop, deploy, and implement iris recognition technology and software. Together, they selected the iris recognition technology developed by Iridian Technologies of Moorestown, NJ. This identification technology was then combined with an Entry Access Control system developed by Biometric Solutions Group of Charleston, SC. These two sets of technologies were designed to identify teachers and staff seeking to enter the schools, make a decision about whether to grant entry, and to unlock the doors if the person was approved. A second application was used as an identification system for parents who wanted to pick up their children before the end of the school day at the elementary school. Parents voluntarily participated to have their irises scanned rather than signing in
and showing identification to the office staff.

NIJ’s Office of Research and Evaluation provided a grant to 21st Century Solutions, Inc. to conduct an independent evaluation of the project. 21st Century Solutions, Inc., a Maryland-based consulting and research company, was awarded a cooperative agreement in September 2002 for $148,997 to carry out the evaluation.

This executive summary presents the findings of the comprehensive evaluation. The evaluation answered a number of questions: Does the technology work in a school setting? What is the impact of iris technology in the school district? Do faculty, staff, and parents feel safer or more secure? What are the unintended consequences of the technology? What lessons can be learned for implementing it in other schools? In what ways might it be improved?

The Setting: Plumsted Township, NJ

Plumsted Township is located in Ocean County, New Jersey in the geographical center of the state. New Egypt, where the three schools in this study are located, lies within Plumsted Township.

Plumsted Township is racially homogeneous; only 6.1% of its residents are nonwhite, compared with 27.4% for New Jersey and 24.9% for the United States as a whole. It also had a higher median household income in 2000 than both New Jersey and the United States. Plumsted Township’s median household income was $61,357, compared with $55,146 for New Jersey, and $41,994 for the United States (Census, 2000). Plumsted Township also has fewer than half the proportion of renter occupied housing units than the averages for New Jersey and the United States, lower population

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mobility, fewer individuals and families living beneath the poverty line, a lower unemployment rate, a higher proportion of high school graduates, but a lower proportion of people with a Bachelor’s degree or higher.

The Plumsted Township School District is comprised of three schools ranging from grades K–12, and was responsible for educating more than 1,700 students in the 2002-2003 school year. The District has one elementary school, one middle school, and one high school. The elementary school houses special education pre-kindergarten through fourth grade. The middle school houses fifth through eighth grade, and the high school houses ninth through twelfth grade. Both the middle school and the high school were built within the past seven years. In September 2004 a new primary school for pre-K to first grade will open, which will alleviate some of the crowding at the elementary school.

Iris Recognition Technology

Iris recognition technology uses a video camera to take a picture of a person’s eyes and then compares the images to information in a computer database. A stored image of the iris and personal information are included in the database. Like fingerprints, the human iris is unique to each individual. Unlike other technologies, however, iris recognition does not require physical contact with the individual. It is, therefore, one of the least intrusive technologies currently available. It has been proven to work with people wearing glasses and contact lenses and in the identification of all ethnic groups.

In addition, research has shown that the likelihood of a false negative (an authorized person is denied access) and/or a false positive (an unauthorized person is
given access) is much lower for iris recognition than for other biometric technologies, including fingerprints, hand geometry, and facial recognition. False negatives occur in only .1% to .2% of cases, while false positives occur once in approximately 1.2 million cases (Iridian Technologies, 2002). These are only estimates of course, especially when considering that there is a compensatory relationship between false negatives and false positives – the sensitivity level of the iris scanning software can be adjusted to suit the needs of its application.¹

The Evaluation

From October 2002 to July 2003, staff from 21st Century Solutions, Inc. conducted a process and impact evaluation of iris recognition in New Egypt’s elementary, middle, and high schools. The evaluation relied on a number of different research methods, including both qualitative and quantitative approaches. The research team visited New Egypt on numerous occasions to interview teachers, staff, parents, visitors, and other stakeholders; we observed the use of the iris scanners, informally and formally, using systematic social observation methods; we administered surveys to parents and teachers; and we collected “official” data on school visitation patterns. All of these methods were intended to shed light on two key issues: what was the experience of the schools in implementing iris recognition technology, and what was the overall impact of the technology.

¹ In a prison setting, for instance, one would adjust the software to ensure that the chances of a false positive are negligible; to do otherwise would be to increase the probability of an escape. Doing so, however, would result in a higher false negative rate, which would mean that some people might be “rejected” when in fact they should have been accepted.
Implementation

The Assistant Superintendent and the Technology Coordinator of the Plumsted Township School District were responsible for the project. They worked with New Jersey Business Systems and other vendors to install T-PASS. After careful planning, purchase, and installation, the group successfully implemented the iris recognition technology during the 2002-03 school year. Eleven cameras were installed in three schools. Five cameras were placed outdoors and six cameras were placed in vestibules in the schools. We found:

- Teachers, staff, and parents were enrolled in the T-PASS program with very few problems; only one teacher could not be enrolled.

- During the first few days of implementation, some problems with the system arose – the cameras would “freeze up” and become inoperable. Signage regarding the use of the buzzer and iris cameras was confusing to users and some individuals had problems looking into the cameras and gaining access to the buildings. Overall, however, the use of the technology was successful.

- During the project period, 78 percent of the transactions were successful; that is, a person seeking entry was validated and allowed to enter. In 5.8 percent of transactions entry was denied because the person was not enrolled and thus not allowed to enter using their irises for validation.

- When cameras were placed indoors, the system worked well. In outdoor locations, the glare from the sun and other lighting problems prevented individuals from using the cameras properly.

- Teachers using T-PASS believed that it provided more security in schools than in previous years. Over half felt that using T-PASS was more convenient than the buzzer system.

- Parents using T-PASS believed that it provided more security than in previous school years. They also believed that it was easier to use than the buzzer system.

- Sixty percent of parents who signed out their child from school during school hours and used T-PASS believed that it provided more security than the old process. They also believed it was easier to use than the sign-out method.
Observations indicated that tailgating (following a person into the building without buzzing or using the scanner) occurred routinely.

Impact Findings

To measure the impact of the iris recognition technology, we conducted surveys of parents and teachers, observed activities, and interviewed key participants in the project.

Impact on parents

To determine the impact on parents, two waves of surveys were conducted and analysis done on the changes that occurred between the first and second waves of the surveys. We found:

- No significant change in perceptions of problems existing at school, perceptions of safety around/in the school, or in the efficiency of the sign-in process;
- Perceptions of problems in the neighborhood decreased slightly but this decrease was not statistically significant.
- Perceptions of security increased significantly from wave one to wave two;
- Perceptions that “getting into the school building without being noticed is easy” and “propping open the doors that are locked is common practice at the school” decreased significantly;
- Parents enrolled in the system were able to leave much faster than those parents still waiting to sign themselves out manually;
- People who used the iris scanners perceived increases in the number of problems in school and in the neighborhood relative to those using the buzzer.
- Changes in perceptions of safety, security, and efficiency were no different for those using the iris scanners than they were for those using the buzzers.

Impact on teachers and staff

We also conducted two waves of surveys of teachers and staff. We found:
Teachers perceived significantly more problems in the school and in the neighborhood, than parents;

Teachers perceived the school to be safer than parents did;

Teachers and staff in all three schools experienced significant decreases in their perceptions that “getting into the school building without being noticed is easy”;

Perceptions of security at the elementary and middle schools increased significantly;

Teachers and staff at the elementary school experienced a significant decrease in their perception that “propping open the doors that are locked is common practice in the school”; teachers and staff at the other schools showed no change in this perception;

The strongest support for iris technology came from the elementary school secretaries who said that it “significantly cut down on the amount of parents walking around the school trying to find their kids.”

**General Recommendations**

The following recommendations are general in scope and are intended for those schools, security directors or managers of buildings, and homeland security experts with interest in access control devices.

**Recommendation 1.** Overall, we found that iris recognition technology coupled with the buzzer system can potentially be an effective way to control access and try during school hours if coupled with other less expensive and more mundane security measures. Iris recognition equipment should be *one* part of a school-wide or system-wide policy on physical access control and physical security.

**Recommendation 2.** If iris recognition technology is used in other schools we
recommend that school administrators and security personnel pay close attention to
tailgating and to include policies that will prevent doors from being propped open or
unlocked.

Our security surveys found certain doors open or unlocked routinely. One doorway had a
brick, used to prop open the doors, located in the foyer throughout the evaluation period.
Students and teachers were routinely willing to open doors for us when we would try to
open locked doors during our security surveys. Teachers propped open one side entrance
at the high school when the iris scanners malfunctioned. The electrical room in the high
school was left unlocked; from it, one could shut down all the power in both the middle
school and the high school, which would shut down all the iris scanners and lock all the
exterior doors. Iris scanners cannot work effectively in an environment where other,
sometimes simple, elements of physical access control are not taken into account.

Recommendation 3. The efficacy of iris scanning as a physical access control measure
can be improved by taking into account the architectural features of its environment. For
many years, police, security experts, and criminologists have been aware of the role that
the physical environment can play in security, crime, and violence. Crime prevention
through environmental design, or CPTED, is the term used to describe efforts to improve
security and safety through changes in the physical environment. Several members of the
research team, including one elementary school teacher with experience in several
jurisdictions, were surprised by the design of the entrance to New Egypt Elementary
School. With just a few parents or visitors in the main office, the office staff has an
obscured view of the main lobby. When the office is crowded, it would be very easy for somebody to tailgate their way through the front doors and enter the school without being seen. Iris scanners, therefore, should be implemented together with architectural planning that takes into account the ability for office staff to see clearly all who enter.

**Recommendation 4.** Iris scanners and/or appropriate housing devices need further development before being installed outdoors. We found significant camera error rates for the outdoor cameras. Glare from the sun seemed to be a primary problem, though we also documented significant failures on overcast days and in installations that were not in direct light. A method needs to be designed for installing the cameras outside that shields them from the elements, protects them from vandalism, but still permits them to work as intended.

**Recommendation 5.** Future field evaluations of iris recognition and other biometric access control measures should address tailgating, should adopt a longer evaluation time frame, and should test the technology in a setting with a higher base rate of crime and disorder and a more heterogeneous population.

**Recommendation 6.** School security technologies, including iris recognition, appear to have the twin effects of increasing perceptions of security and increasing the number of perceived problems. These effects need to be anticipated, studied, and addressed by evaluators and school authorities.
Specific Recommendations for the Plumsted Township School District

In addition to the general recommendations noted above and based on our findings and observations we make the following specific recommendations to the Plumsted Township School District:

**Recommendation 1.** Because of the overall success of specific cameras in specific locations, we recommend that the iris cameras located in enclosed entryways or vestibules should remain in use. Cameras located in outdoor areas where the success rate was less than 75% should be re-located.

**Recommendation 2.** Iris scanning can significantly reduce the work of front office staff if it is complemented by software designed to automatically print labels for each incoming visitor. Asking visitors who have already been admitted via iris recognition to sign-in and make a label for themselves is inefficient, when a label could be waiting for them upon arrival in the front office. This is particularly true during peak periods of activity when the front office becomes congested with visitors. Using labels may also reduce the number of tailgaters, as labels would only be printed if a visitor has used the scanner.

**Recommendation 3.** With strong support of the iris recognition technology in the sample of parents at the New Egypt Elementary School, we recommend that it be used for all parents to obtain release of their child/children during school hours. With the construction of the New Egypt Primary School, we recommend that the school district enroll parents in a similar fashion at the primary school.
Recommendation 4. Iris recognition cameras should be moved from the current outdoor locations that are ineffective to the New Egypt Primary School for use by parents and school staff. In addition, we recommend that the buzzer system and video cameras be placed at entrances at the primary school.

Recommendation 5. Video camera images of the entrances should be on computer screens at all times. We found that staff did not use the video images because their computers would work slower and less efficiently. We recommend that separate computer monitors be used for video camera images only and should be located near the intercoms on desks of staff in the front offices of each school.

Recommendation 6. Appropriate staff at each school should receive training to enroll new teachers and employees in iris recognition technology.

Recommendation 7. Training in the use of iris recognition technology should be provided to all school staff prior to the beginning of the school year.

Recommendation 8. Training in the purpose and use of iris recognition technology should be provided to all parents at the New Egypt Elementary and Primary Schools.
Recommendation 9. Policies and procedures should be provided to all school staff and parents regarding iris recognition technology, the use of buzzers, general security measures (such as keeping doors locked and not tailgating) and other safety precautions.