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People Profiling & Behavior Tracking

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1.1 Scope

Screened people profiling and behavioral tracking are part of the tools used in an attempt to significantly reduce security threats (and problems such as drug trafficking) without inconveniencing individual screened people en mass and consequently causing delays that increase costs borne by checkpoints operators.

Figure 1 - Profiling and Behavior Tracking – Principles of Operation

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                        ┌──────────────────────┐
                        │      All People      │
                        └──────────────────────┘
                           │               │
                  ┌────────────┐      ┌──────────────┐
                  │   Regular  │      │High Selective│
                  └────────────┘      └──────────────┘
                                       │            │
                              ┌──────────┐    ┌──────────┐
                              │ Unaware  │    │  Aware   │
                              └──────────┘    └──────────┘
                                   │               │
                              ┌─────────┐    ┌──────────┐
                              │  Naive  │    │ Terrorist│
                              └─────────┘    └──────────┘
                              ┌─────────┐    ┌──────────┐
                              │ Partly  │    │ Suicide  │
                              │ Naive   │    │ Terrorist│
                              └─────────┘    └──────────┘
                              ┌─────────┐
                              │ Framed  │
                              │Terrorist│
                              └─────────┘
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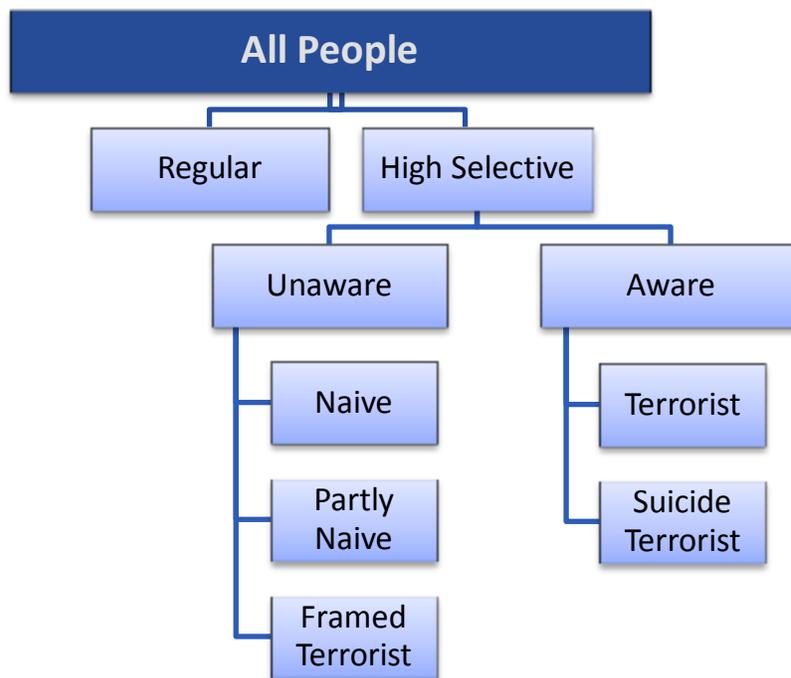
Profiling and behavior tracking is no longer a single activity, low tech effort. It has evolved over the years (since 1994) to include a variety of mitigating activities including the following:

❑ **Computer-Assisted People Pre-Screening (CAPPS) –** This requires screened people to provide personal information when they make reservations. CAPPS and CAPPSII were programs that never took off.

❑ **Screening Screened People by Observation Techniques (SPOT) –** Behavioral Pattern Recognition. In this method, security officers use the technique to flag screened people who appear to be acting suspiciously. While it is behavior, not race or ethnicity that is being tagged, there are concerns that behavior pattern recognition can turn into racial profiling or subject innocent people to illegal searches without sufficient cause.

❏ **Electronic Behavior Tracking –** This method uses a combination of sensors, such as infrared cameras, biometrics, together with computer-based algorithms designed to detect and examine people whose behavior is atypical. These techniques, most of which are now in the development and testing phase, use "triggers" to catalyze a response in people and then to follow up on the manifestations of these "triggers".

It is important to remember that Richard Reed, the "Shoe Bomber" was interviewed repeatedly in France before being allowed to board a flight to the U.S – bomb shoes and all!

In America, profiling started (officially) in 1994 when Northwest Airlines started work on the Computer-Assisted People Pre-screening System (CAPPS). Despite concerns by civil liberties organizations, the government continued to encourage use of profiling and its practice remained widespread. A 1997 Justice Department report and 1998 Senate Subcommittee aviation hearings concluded that CAPPS was being implemented in a fair way. They recommended Federal Aviation Agency (FAA) oversight to make sure that profiling remained fair.

The attacks on September 11, 2001 brought about a renewed interest in profiling and the DHS developed two programs CAPPS II and the Secure Flight Program.

CAPPS II required screened people to provide personal information when they made reservations and so has been abandoned. Secure Flight requires airlines to share the names of screened people with the government for comparison with a centralized list of terrorist names and is still in practice.

A mathematical argument published by Susan Martonosi, a mathematics professor at Harvey Mudd college and Arnold Barnett of MIT's Sloan School of Management in the December 2006 issue of Interfaces which is published by Institute for Operations Research and the Management Sciences (INFORMS) casts doubts on the comparative effectiveness of profiling compared with for example, basic screening of all screened people. The two professors developed a mathematical model for judging the effectiveness of different security measures (both prevention and deterrence). The model demonstrated that improving screening methods for all screened people is more likely to improve airline safety than "people centric solutions" (profiling to its varieties).

It is also important to remember that no single or combination of screening machines (as the professors recommend) EVER detected a bomb in real life, and/or prevented one from boarding a plane; profiling methods, on the other hand, prevented several attempted bombing (including the Israeli's arrest of an Irish woman Anne-Marie Murphy, who in 1986 was transporting a bomb planted in her luggage without her knowledge by her Palestinian lover).

Despite arguments about profiling slowing down people processing, it is actually possible to postulate an inverse scenario where most screened people are "fast tracked" to the aircraft without the "benefit" of x-ray screening and metal detectors. Those whose appearance or behavior alerts the observers (profilers)

would be subjected to the highest level of screening such as questioning, hi-tech body scans and physical searches.

Between the "fast trackers" and the "profiled", there will be a third class of screened people - those who fit neither category. Such "uncertain" people would be given the initial profiling treatment, in an attempt to determine whether they should be fast tracked or thoroughly screened.

To ensure that the system is unpredictable, non-profiled individuals should be randomly selected for the "profiled" security check.

Data on the efficiency of SPOT is limited, but it is known that in 2006, about 70,000 travelers were "detected" by behavior screeners and referred for additional screening. Of those, several hundred were later detained for a variety of criminal offences such as drug possession (possibly an indication of the utility of the general concept), but it is not known if any actual terrorist activities were foiled.

SPOT is now practiced at more than fifty airports around the U.S. and will probably continue to grow over the forecast period.

1.2   Profiling Types

There are four main types of people profiling:

- ❑ Demographic
- ❑ Ethnic
- ❑ Behavioral
- ❑ Positive

Of course, it is also possible to institute additional types of profiling, mainly to include two or more of the basic types.

1.2.1   Demographic Profiling

Demographic profiling uses attributes such as age, income and travel patterns to zoom in on people of interest.
For example:

- ❑ If you travel extensively and frequently to the Middle East.
- ❑ If you are young, working class and travel frequently to exotic locations.
- ❑ If you are a young person (mostly man) from the Middle East and you travel frequently for short periods to locations in Western Europe.

1.2.2   Ethnic Profiling

This type of profiling is often also called religious profiling (ethnic/religious). It has become more visible and was discussed and examined more in the aftermath of 9/11. Following the terror attacks on the U.S., and in Western Europe, Muslims in general and Middle Eastern Muslims in particular are attracting a lot more attention than other screened people.

The rationale holds that being young, male and Muslim makes you much more likely to engage in terrorism. Aside from the obvious tendencies towards abuse, a problem with this method is that potential terrorists know what "profile" the examiners are looking for and are very likely to try to mask their origin or use ethnically "correct" carriers (mules) to accomplish their objectives.

1.2.3   Behavioral Profiling

This type of profiling relies on the observer's skill in detecting telltale indications that something out of the ordinary is taking place. Such indications may be avoidance of eye contact, sweat, general uneasiness, shifting gaze, easily aroused nervousness and defensive responses.

Of course, considering the fact that many of the stress indicators manifest themselves naturally in people who are not used to travel, under stress, etc., the possibility of false positives is quite high. The only remedy for this is an observer skilled enough to not only reading the indications, but to gently tease out the reasons for the indicators.

Since this type of profiling uses behavior rather than ethnicity or religion, it stands a better chance of avoiding deliberate or "blind" discrimination of one group or another. Further, it stands a better chance of selecting a perpetrator rather than an innocent person. This method relies heavily on a screener's skills and alertness and will require talented personnel to properly perform their task.

Experience and history show that behavioral profiling is much more substantive than ethnic profiling. Considering the adaptability of terrorists, it is unlikely to assume that they will not resort to using "western" looking colleagues (witting and unwitting) to carry out attacks particularly on the aviation industry.

1.2.4   Positive Profiling

The U.S has opted for this type of profiling but it has yet to be implemented with any degree of success. Under this approach, people who wish to avoid the inconvenience of being screened agree to be vetted (for a fee) by the transportation security authorities. In return, these individuals receive a special card, bearing biometric identifiers which allow them to take an "express" path and avoid all but random screening tests (such random tests are designed to prevent

unauthorized persons from taking advantage of the system). All other people are regarded as "suspects" and are fully screened.

1.3   The Purpose of Profiling and Behavior Tracking

Profiling has three goals:

❑ To locate and possibly mitigate the threat of individuals who might pose a danger to facilities, other people or to populations (e.g., airplane hijackers, suicide terrorists).

❑ To identify and neutralize individuals who might be carrying contraband.

❑ To supplement the far-from-perfect capabilities of today's functioning screening technologies.

1.3.1   How Is It Done?

There are two specific modes of profiling:

❑ **Active:** In this mode, the profiler screens people and actively engages those who appear to attract attention. The engagement should be circumspect, friendly and "with a smile", but the purpose will be to collect additional information about the screened person and within ten seconds make a decision as to the need to further inquire into certain aspects of the screened people's behavior.

❑ **Passive:** In this mode, the screeners remotely monitor the behavior of multiple screened subjects.

The main trigger for further inquiry into a person's intentions is an impression (by the profiler) that the screening subject is either lying or that he/she is hiding something about the purpose, itinerary or any other element relating to the trip. Screeners are trained to observe micro-facial expressions and to make split second decisions about the need for additional impressions.

People who raise the screener's suspicion may be asked to undergo further examination including tests using x-ray, MMWave etc.

When a profiler spots a potential suspect, the profiler or some other official approaches the person and strikes a" friendly" conversation including such questions as:

❑ Are you traveling alone?

❑ Have you packed your own luggage?

❑ Has anybody given you anything to take overseas?

The responses are not really as important as the way they are delivered. When the stress normally associated with conversing with a security official is

discounted, innocent people will behave much more openly than someone who has something to hide. Demonstrated stress, fear and/or anxiety are significant indicators that more in-depth questioning may be warranted.

Similarly, the passive profile looks for such indicators as presented above to become much more pronounced when a potential perpetrator approaches a security portal or a checkpoint.

1.3.2 Behavior Profiling – Drivers

❑ **Behavior Profiling Actually Prevents Terrorism -** In view of the imperfect performance of currently available screening technologies, profiling is actually a proven method that has shown its value in stopping attempted terror (see Anne-Marie Murphy, in 1986). Multiple other perpetrators and criminals (including drug smugglers) were detected using profiling.

❑ **Behavior Profiling is Race-Neutral -** Focusing on a specific ethnic or racial "marker" for profiling purposes is actually bad practice since perpetrators can be from any race, creed or religion. This makes properly practiced behavior pattern recognition a race-neutral profiling technique. The screeners should focus on how people behave and not what they look like.

1.3.3 Behavior Profiling – Inhibitors

❑ **Cost Effectiveness –** Personnel is expensive and in order to work effectively, many screeners are needed (e.g., Israeli method). If a need arises to expand the screening effort to large scale operations (e.g., all airports in U.S.), there will simply not be enough workers and/or budgets to recruit.

❑ **Civil Liberties Infringements –** This is and will remain an enduring concern. It is important to ensure for civil liberties and operational reasons alike that profiling does not degenerate into ethnic/religious profiling of any other group, and that the handling of individuals is done lawfully and respectfully.

❑ **Operational Effectiveness –** Analysts argue that talented and determined terrorists can learn how to "fool" a profiling policy. While this may be true, the chance that it will be incorrect in even a single instance is justification enough.

1.3.4   The Cost of Profiling

The cost of profiling cannot be analyzed separately from the overall cost of screening, which is considerable and increasing annually. False alarms and repeated screenings to deal with those false alarms account for a large percentage of the cost. Profiling is an attempt to control these costs and its own ROI should be looked at in that context.

When analyzing the cost of profiling, it is critical to consider the human element, for it is the quality of the profiler that ultimately determines the return on the investment. Sufficient funds in the form of salaries and benefits must be offered to attract quality applicants who can become trained professionals.

More information can be found at:

Global People Security Screening: Technologies, Industry & Market – 2015-2020