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Near-Term Options for Improving Security at Los Angeles International Airport

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The research described in this report was conducted by RAND Infrastructure, Safety, and Environment (ISE), a unit of the RAND Corporation, for Los Angeles World Airports.

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Published 2004 by the RAND Corporation
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SUMMARY

Commissioned by Los Angeles World Airports (LAWA), this study examines near-term options for reducing the terrorist threat to LAX. Although the study has considered many possible terrorist threats and responses, the study results presented here focus on actions that can be taken at LAX to reduce the terrorist threat. We have not attempted a review of the overall effectiveness of Transportation Security Administration (TSA) procedures nor have we considered general national antiterrorist strategy. Terrorism is a complex international problem; here we are examining it only from LAWA's point of view.

Terrorism has long been a serious problem for the air transportation system of the United States and the world. We note that of 5,347 deaths that have resulted from terrorist attacks on civil aviation since 1980, only 195 occurred in attacks on airports themselves, as opposed to aircraft.

LAX is one of the safest places in Los Angeles. It was one of the first airports to implement baggage screening procedures, an on-site bomb squad, high police presence, a distributed terminal layout, and large numbers of bomb-sniffing dogs. Despite this high level of security, there are good reasons to believe that LAX is viewed by at least some terrorists as a particularly attractive target. Since 1974, LAX has been the site of two bombings, two attempted bombings, and one gun attack.

In meeting the terrorist threat, we find that the problem is how to influence the behavior of an unpredictable enemy. The logical structure of the problem is similar to that of preventing nuclear war, which RAND has studied extensively over many years. The solution is to shape the situation so that in any scenario the outcomes from the terrorist's point of view will be unsatisfactory. The primary goal of this strategy is deterrence. Terrorists will see the airport as an unsatisfactory target that is not worth their effort.

Operationally, the key to implementing a successful strategy of deterrence is to understand and reduce LAX's vulnerabilities. We analyze a wide range of possible terrorist actions and assess LAX's level of vulnerability. We then examine possible alternative courses of action LAX can take to reduce these vulnerabilities.

We do not construct a formal cost-effectiveness measure to evaluate different courses of action because it is not possible to formally evaluate

the chance of any type of attack. In addition, actions taken at LAX will alter the chances of different types of attacks. We analyze scenarios and possible actions in a relative way. Our goal is to identify the most dangerous vulnerabilities and the security improvements that can make them less dangerous. We particularly seek to identify dangerous vulnerabilities that can be mitigated at a relatively low cost.

In this document, we focus on fatalities as an indicator of airport vulnerabilities. We have also investigated economic measures of vulnerability (e.g., reconstruction costs, long-term disruption, and lost earnings) and find that they correspond with the number of fatalities. That is, the attacks that have the largest economic impact are those that result in the largest loss of life. Because of this, the primary conclusions of the study do not depend on which type of vulnerability measure is used.

ATTACK SCENARIOS

Our formal analytic approach begins by constructing a series of attack scenarios—descriptions of ways in which terrorists could attack LAX. This list was compiled based on history, discussions with security professionals at LAX and elsewhere, and our own judgment. Therefore, we focus on the attack scenarios that we found most threatening, a subset of those that we actually studied. We then constructed a list of security improvement options and assessed their impact on each attack scenario. This was an iterative process—the implementation of one security improvement option may change the overall situation in ways that modify the effectiveness of other options. Our iterative approach in assessing options enabled us to understand possible synergies.

We identified 11 major classes of attack. These are not the only possible attacks, but they are the ones that we assess to be most likely and most dangerous. Starting with the scenarios most threatening to LAX with its current security procedures and making very rough estimates of expected civilian deaths, we list the threats as follows:

1. **Large truck bomb.** A large bomb could be concealed in a truck. If the bomb was detonated at the lower level, we expect a large number of deaths, using observed passenger concentrations. This includes deaths from the curbside and baggage claim areas and at the departure level. The front portion of the terminal would be lost (both the arrival and departure levels), along with two sections of elevated roadway.

2. **Curbside car bomb.** A medium sized bomb detonated in the right lane in front of the line for a skycap might cause a large number of deaths. The number of deaths is very sensitive to the density and number of people standing in line.
3. **Luggage bomb.** A small bomb detonated in a large screening line could also produce a large number of deaths. The number of deaths is very sensitive to the density and number of people standing in line.
4. **Uninspected cargo bomb.** A bomb is placed inside uninspected cargo and detonates in a passenger aircraft during flight, killing hundreds of passengers.
5. **Insider-planted cargo bomb.** With the assistance of an employee with access to the airport, a bomb is placed inside a large passenger aircraft, causing it to be destroyed in flight, and killing hundreds of passengers.
6. **Air operations attack.** A well-armed group of terrorists could enter the air operations area by scaling the fence and attacking the fuel area, runways, and aircraft.
7. **Public grounds attack.** A well coordinated, armed, and equipped terrorist group blocks the exit to LAX and attempts to kill as many civilians as possible. Current airport police equipment would be of limited effectiveness against well-equipped attackers.
8. **Air traffic control tower/utility plant bomb.** We assume a car or truck bombing occurs with enough explosives to destroy the air traffic control tower or utility plant.
9. **Man Portable Air Defense System (MANPADS) attack.** We assume that a properly aimed and launched MANPADS attack (small, portable surface-to-air missiles) will result in destruction of an airliner less than 10 percent of the time.
10. **Sniper attack.** A sniper set up on airport-adjacent property with a .50-caliber sniper rifle shoots at loaded planes, firing approximately 50 shots over five minutes.
11. **Mortar attack.** This might be an attack similar to the Irish Republican Army attack on London's Heathrow Airport in which terrorists fired mortar shells along the length of the runway. The attack might disrupt operations for several days, but it would kill few people on average. However, it is possible, albeit unlikely, that a mortar round could hit a loaded plane.

SECURITY IMPROVEMENT OPTIONS

We evaluated a series of possible security improvement options that make the threat scenarios less dangerous. Different security improvement options will have different consequences depending on the threat scenario. We focus on security options that offer the greatest effectiveness against the most threatening attacks. We then estimate costs, both initial and recurring, for each security improvement option.

One fact that consistently emerges from our analysis is the following: **It is not the size of the bomb that matters most; it is where it is detonated.** All of the most dangerous terrorist attacks involve terrorists placing a bomb in close proximity to a vulnerable crowd of people. There are two general ways to reduce this vulnerability: Move the possible bomb detonation away from the people or move the people away from the possible bomb detonation. Both approaches are valid, and we provide specific recommendations for both.

Security improvement options fall into four broad categories. The first group contains low-cost options that greatly reduce LAX's vulnerability. These should be acted upon immediately. The second includes high-cost options that greatly reduce LAX's vulnerability and should be studied to identify affordable, time-phased solutions. The third includes low-cost solutions that modestly reduce LAX's vulnerability and can be addressed in a more deliberate fashion as opportunities arise during planned modernization. The fourth group includes expensive solutions to modest problems that we do not recommend.

Low-Cost Options That Greatly Reduce Vulnerability: Clearly Recommended

Limit density of people in unsecured areas—where baggage has not been inspected or areas near uninspected vehicles. Eliminating lines at baggage check-in is very effective because these lines are an attractive target. For example, a terrorist could bring a substantial bomb concealed in luggage with little risk of arousing suspicion. Similarly, lines outside terminals (e.g., for curbside check-in) are dangerous because they make an attractive target for a vehicle bomb.

It may be surprising to some that the costs of eliminating check-in lines are quite modest according to our assessments. Overall airport efficiency, including the operations of LAWA, the airlines, and TSA, is not enhanced by having people stand in line. The amount of actual work required to check bags, etc. remains the same whether people have waited or not. Substantial reduction of lines can be implemented immediately with small

changes to airline and TSA staffing policies. This is our strongest recommendation.

Add permanent vehicle security checkpoints with bomb detection capability. Large vehicle bombs can be detected by quick examination of vehicles entering the airport. Improved technology is becoming available, but even simple vehicle scales can identify suspicious vehicles, which can then be diverted before entering the airport proper. This procedure will greatly reduce the threat from large vehicle bombs and provide some effectiveness against smaller bombs. It will not be effective against small bombs concealed in luggage, which would require a detailed, expensive search operation.

High-Cost Options That Greatly Reduce Vulnerability: Possible Recommendations

Implement additional inspections of cargo on passenger flights. Additional equipment and staff could be used to increase the probability that explosives in air cargo carried on passenger flights would be detected. Such a screening program would be expensive, on the order of \$100 million per year at LAX. Determining the optimum level of cargo screening is a TSA responsibility, and such a program should logically be implemented at a national level.

Enhance screening of airport personnel. Background checks on personnel allowed unrestricted access to the airport operations area could be more thorough than they are at present. For example, all personnel employed in catering, etc. could be required to undergo the same background screening as is currently required for TSA screeners. This would be expensive. The cost of the investigations themselves would be large because of the large number of people who would need to be investigated. Moreover, security clearance procedures have the effect of disqualifying people who are not actual terrorists but have had some problem in their lives, usually involving money, which makes them more vulnerable to pressure or recruitment by terrorists.

Low-Cost Options That Modestly Reduce Vulnerability: Possible Recommendations

Enhance training of airport rapid reaction team. There is a possibility that well-trained terrorists with automatic weapons and body armor could attack either the passenger terminals or the operations area. There is a distinct possibility that the existing airport police force might not be able to respond effectively to such an attack. Development of an airport police

SWAT (special weapons and tactics) capability could reduce this vulnerability. This is relatively inexpensive. However, we believe that such an armed incursion is, from the terrorists' point of view, a poor strategy. It will probably kill fewer people than a well-placed bomb, and it will be difficult for the terrorists to get away.

Improve perimeter fence. A double fence with motion detection capability would improve LAX's ability to respond to intruders attacking the air operations area. Particularly coupled with the enhanced rapid response team described above, this could make attacking over the fence even less attractive to terrorists than it already is.

Options Not Recommended

We have examined a wide range of possible security enhancements that we do not recommend because their likely effectiveness is relatively low compared to their cost. That does not mean that they are bad ideas. It means that they are relatively bad compared with the options we recommend. For example, diverting all vehicles to remote lots and busing passengers to terminals would reduce vulnerability to vehicle bombs, but it would cost a great deal more than reducing the size and density of vulnerable lines and screening for large bombs.

This study has focused on near-term options. We assess that LAX, which is already one of the more secure airports in the United States, can be made significantly more secure by the following high-priority actions.

Low cost:

Greatly reduce the number and density of people standing in line in unsecured areas.

Establish vehicle checkpoints to search for large vehicle bombs.

Higher cost:

Enhance screening of airport personnel.

Enhance inspection of cargo.

Finally, the security of LAX is the joint responsibility of many agencies. LAWA should continue to work closely with national and international airport security organizations to raise the level of security across the entire air transportation system.