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Stealing the Sword

Limiting Terrorist Use of Advanced Conventional Weapons

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Summary

This book examines one manifestation of the general technical competition between terrorist groups and security organizations—the balance between the potential use by terrorists of advanced conventional weapons and the responses available to deter or counter them. Our use of the term *advanced conventional weapons* is inclusive and broad: any new or unusual conventional weaponry developed for ordinary military forces. Such weaponry seems a priori likely to be particularly threatening in the hands of terrorists. All weaponry is obviously designed to do damage, but new design features might enable new, or at least unfamiliar, terrorist attacks. At the same time, the usual limitation of weaponry to militaries implies that various controls could be applied, albeit less stringently than controls imposed upon nuclear, chemical, or biological weapons. Consequently, the competition involving advanced conventional weaponry seems both complex and potentially important.

One example of this competition has received much attention—the balance between terrorist use of man-portable air defense systems (MANPADS) and U.S. responses. The November 2002 attacks in Mombasa, Kenya, using Russian-built MANPADS against an Israeli airliner, demonstrated that terrorists are able to acquire and use that type of advanced weaponry. In response, the United States has negotiated a multinational agreement that calls for imposing both technical and procedural use controls on new MANPADS through an expansion

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1 Bayles (2003).
in scope of the Wassenaar Arrangement. The United States has also started a pilot program within the Department of Homeland Security to demonstrate technical countermeasures suitable for protecting commercial aircraft from MANPADS. But MANPADS are only one of a long list of advanced conventional weapons that are potentially attractive to terrorists. This monograph explores a range of other weapons, both those still under development and those already available but relatively unused by terrorists. The monograph identifies those weapons that require greater attention from U.S. homeland security decisionmakers and outlines a number of actions that can mitigate the use of these weapons by terrorists.

**Key Weapons of Concern**

This project identified five types of advanced conventional weapons that could, in the absence of mitigating measures, provide terrorists with a qualitatively new and different capability. Each of these weapon types threatens in some sense to change the nature of terrorist attacks:

- sniper rifles and associated instrumentation
- improved squad-level weapons of several types
- long-range antitank missiles
- large limpet mines
- precision indirect fire systems.

Sniper rifles and especially their electronic support equipment allow a relatively unskilled marksman a reasonable chance of assassinating an individual from great ranges—up to 2 km—which can be well outside the area that a security force guarding an official would consider threatening.

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Improved squad-level weapons could provide a terrorist assault force with a variety of new abilities, from individual indirect fire to the ability to eliminate a strong point with a short-range, antitank weapon. Advanced armor-piercing ammunition is available for many rifles and will easily penetrate standard body armor.

Long-range, antitank weapons can destroy any vehicle and kill its occupants from beyond 2 km. These same weapons can also destroy a small building or speaking platform. Advanced versions of these weapons are further reducing demands on the operator, which may make these weapons highly attractive to terrorists.

Large limpet mines attached to a ship’s hull have the capability to sink large, oceangoing vessels. Even smaller, more common limpet mines can sink small ships; in fact, if multiple mines are carefully emplaced, these small mines can also sink large ships. In particular, cruise ships and ferries would be vulnerable to such devices, placing their many passengers at risk. Such external mines would, of course, not be detected during conventional cargo and passenger inspections.

Finally, precision indirect fire systems—primarily advanced mortars—can enable a wide range of new terrorist attacks: on crowds in outdoor venues; on valuable physical targets, such as refineries or aircraft; and on officials or other individuals appearing at known locations, particularly in the open, such as at a press conference.

In all of these five cases, the new systems could enable the attackers to surprise security forces. The attacks could come from far beyond any controllable security perimeter, could allow a high probability of escape for the terrorists, or could require only a single, small attack to be effective.

Reducing the Threat by Raising Awareness

The first step in limiting the threat from these systems is to raise awareness of the threat. In all cases, key groups need to understand the capabilities provided by these systems. Awareness of the new capabilities should allow technical or operational changes by security forces. Such
efforts may include the following key groups and threat mitigation measures:

- Personal protective services, such as the U.S. Secret Service, whose job it is to guard high-profile individuals, need to realize that snipers and antitank weapons can make lethal line-of-sight strikes from over 2 km away. They also need to realize that non—line-of-sight weapons, such as precision mortars, will soon allow very long-range, precise attacks on targets at known locations. This awareness should enable protective services to reduce opportunities for terrorist to make use of such weapons.

- Guard forces at sites and facilities need to be aware of the capabilities that new, squad-level weapons would provide to an assault force attacking them. For example, the addition of precise, indirect fire grenades should generate a greater concern with overhead cover. New rocket-propelled grenades, thermobaric warheads, and short-range antitank weapons will require enhanced fortification at strong points. Even today, currently available small-arms ammunition should motivate upgrades in guard forces’ personal armor.

- Operators of cruise ships and ferries—particularly oceangoing ferries—should be aware of the potential use and impact of large limpet mines. This awareness should motivate the use of protective cordons and hull inspections before leaving port.

Reducing the Threat Through Procedural and Technical-Use Controls

Beyond awareness are procedural and technical-use controls. Most advanced conventional weapons are intended only for military use. This means that basic procedural controls governing the use of military systems will provide some limits on terrorist uses. We note two major exceptions not under such controls: sniper rifles and their accessories and advanced ammunition. For those weapons, only awareness and the precautions taken by security forces can mitigate their threat.
All the other advanced systems will presumably be subject to international procedural controls common to military systems; these controls likely will slow their diffusion to terrorist groups. But, as the preceding example of MANPADS clearly shows, even relatively expensive, controlled systems can end up in terrorists’ hands.

Adding technical-use controls in many instances would represent a major step—both organizationally and technologically. First, to be effective, such technical controls require an international agreement. The continuing, complex diplomatic efforts to enhance the controls over MANPADS, where the threat has already been clearly demonstrated, illustrate the scale of any new diplomatic effort that would be required concerning other advanced weapons. We believe that to justify and to motivate such an effort would require both an increased awareness of the threatening weapon system and also readily implementable technical controls. In our view, most of the systems do not meet these two criteria.

One system, we assert, does meet both of the criteria—precision, indirect fire systems based on an advanced mortar. Many terrorists already have had some favorable experiences with mortars, notably including those terrorists being trained in the ongoing Iraqi insurgency. Because future advanced mortar systems must depend on the Global Positioning System (GPS) or an equivalent satellite system, these precision, indirect fire systems also have technical features that could facilitate various sorts of use controls. In particular, integrated electronic systems involving GPS can be designed to require a “trusted component,” which would be difficult for a terrorist group to circumvent. At the same time, this trusted component would serve as the key element for technical controls. A range of limitations then becomes feasible in principle, such as the imposition of expiration times or geographic boundaries beyond which the system would not function. Importantly, these limits would be all but invisible to legitimate military users, so they would add little operational burden. But the intent

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4 Since GPS is the only widely available satellite navigation system today, the examples and discussion in this book all refer to GPS. The arguments we make involving GPS would hold for any similar satellite navigation system, however.
of these limitations would be to make them unreliable and unattractive to most terrorist groups, particularly as unauthorized users would have no way of checking the precise times, places, or circumstances in which the system would fail.

The best time to implement such technical controls is when the system is in its design phase. Controls added “on top,” after a design is “frozen,” tend to be easier to circumvent. Fortunately, the most threatening system we have identified—the GPS-guided mortar without terminal guidance—is not yet in its development phase. This situation creates an opportunity to consider ways to apply the appropriate controls. We expect that this window of opportunity will close within the next few years, however, because the military utility of and demand for such a system will be high.

**Steps for Moving Forward**

The most worrisome advanced conventional weapons that we have identified in this research are advanced, GPS-guided mortars. Only these systems combine a significant, new capability for terrorists with a lack of effective operational counters for security forces. We must take advantage of a fleeting opportunity to design controls into the weapons. This means that starting efforts to control advanced mortars now is urgent. Although seemingly less threatening, the other advanced weapons—sniper weapons, advanced small arms, antitank guided weapons, and limpet mines—still do require some responses. Most important, they require simple awareness on the part of security forces, and also some new techniques, such as external searches of ships before leaving port.

If the United States chooses to pursue opportunities to place additional procedural and technical-use controls on precise, indirect fire weapons, such as GPS-guided mortars, we believe that two initial steps are called for. The first step is to begin diplomatic discussions with the key producer nations, so that all the involved decisionmakers and stakeholders begin evaluating potential terrorist uses of these systems. The second step is to commission a detailed study of the techni-
cal modules and architecture needed to implement proposed technical controls. Such an investigation would be directed at determining whether the existing technical modules would be sufficient or whether they might need to be modestly expanded to include the required control functions.

The U.S. Department of Homeland Security can play a key role in both these steps. Regarding the first step identified above, the department has the primary responsibility for deterring terrorist attacks. It could use that role, within the interagency process, to push for starting diplomatic discussions. This may also entail changes in the interagency system, such as permanently including the Department of Homeland Security on interagency panels that are considering arms exports. For the second step, the department could itself directly fund such a study, perhaps in concert with the U.S. National Security Agency.

While there appears to be sufficient time to negotiate and develop meaningful controls on GPS-guided mortars, that opportunity can be lost if the United States does not begin the process soon. Missing this opportunity would reduce the controls on these mortars to the existing procedural ones for military systems in general and so increase the burden on security forces to plan around and counter such attacks. Although that may be a sufficient response for the other weapon systems we have analyzed, it appears to us to be insufficient for limiting the threat from these future, advanced mortars.