BACKGROUND

During the Gulf War and more recent Operation Allied Force in Kosovo, the United States Air Force (USAF) was confronted with targets that were extremely difficult to detect, recognize, and attack from airborne platforms. In the Gulf, such targets were mobile SCUD missiles operating in the desert wastelands of western Iraq. These elusive missiles would come out of hiding to fire missiles against population centers in Israel and Saudi Arabia, then move to another “hide” before allied aircraft could find and destroy them. Of potentially strategic significance, these missiles threatened to draw Israel into the war, a move that could have split the allied coalition.

In Kosovo, elusive targets were Serbian army and national police conducting “ethnic cleansing.” Operating in small groups, often at night, such ground forces would go into villages to drive Albanian Kosovars from their homes, often killing them in the process. The Serb forces would then move elsewhere, hiding in barns, schools, and woods. Operating under strict rules of engagement (ROE), allied forces found that it was nearly impossible to detect, recognize, and attack these forces from the air. Without friendly ground forces to compel the Serbs to build defenses, concentrate forces, and otherwise move in more traditional ways, there was little hope that NATO could directly end Serb “ethnic cleansing.”

Despite these shortcomings, allied strategic objectives were achieved in each case. The United States directed a large fraction of its air effort and deployed its very best special forces to find the SCUDs and
deployed Patriot missiles to Israel, all to keep the Israelis from intervening militarily. It was a close call, but it worked. In Kosovo, NATO conducted a highly constrained coercive air campaign that smacked of Vietnam-era gradualism—much to the dismay of airmen at all levels. Remarkably, just when observers were concluding that President Slobodan Milosevic’s willingness to accept damage to the Serbian civilian infrastructure greatly exceeded NATO’s willingness to inflict such damage, he capitulated.

Although its inability to defeat elusive targets directly did not prevent the United States from achieving national objectives in the Persian Gulf War and Kosovo, it would be wishful thinking to assume that future operations will always turn out so well. For example, future mobile missile systems could be much more capable than SCUDs. Future adversaries will likely have access to commercial satellite imagery, accurate maps, detailed geographic databases, Global Positioning System (GPS) guidance, and submunition technology, which will make mobile missiles accurate, lethal weapons that can effectively attack aircraft in the open, ships in port, electrical-power-generating plants, communications and command centers, fuel depots, and troop concentrations. Requiring robust defenses and/or an ability to detect and attack the mobile missile transporter-erector-launchers (TELs) directly, such weapons will not be as easily dismissed as the SCUDs were.

Similarly, in a future Kosovo, it may not be possible to wait 78 days for a coercive campaign to succeed. There was great controversy in Europe over the morality and legality of the air campaign against Belgrade, reflecting increasing Western sensitivity to actions that harm civilian interests. In such situations, it would be very helpful to have options that strike directly at the aggressor rather than relying on indirect approaches that may not be politically viable and that, even under the best conditions, have largely unpredictable results.

For these reasons, the Defense Department should explore options to enhance its ability to detect, recognize, and neutralize elusive targets, whether “ethnic cleansers,” ground units operating in a dispersed mode, or mobile missiles. Since aerospace forces have been and are likely to be called upon in the future to defeat these targets in situations in which ground forces are unavailable, the USAF has an important role in developing enhanced capabilities.
KEY FINDINGS

This book explores the nature of elusive targets in Kosovo-like peace operations, as well as in larger conflicts, presents concepts of operation to defeat such targets in both types of operations in the 2020 time frame, describes key technologies, and makes recommendations for the USAF. Key findings of this study are as follows:

- Four key capabilities are necessary to defeat elusive forces:
  - Wide-area surveillance of enemy operating areas
  - Automatic filtering out of a high percentage of false targets
  - Getting a high-resolution image of remaining suspected targets into the hands of controllers who have the authority to order strikes
  - Putting fires on the targets before they disappear.
- The United States currently lacks the ability to detect, recognize, and defeat elusive targets in sufficient numbers to produce the desired operational and strategic effects.
- Elusive targets, which are by definition fleeting and difficult to detect, recognize, and track, place a premium on speed in moving information, making decisions, and delivering weapons. In many cases, strike platforms will need to be on airborne alert to deliver weapons in time; for some scenarios, high-speed weapons may be necessary.
- In operations for which there are a relatively small number of potential vehicle targets, the detection, recognition, and strike process may be completed in a few minutes. In contrast, a China scenario, in which there are hundreds of thousands of potential targets, could require continuous radar tracking for periods of an hour or more to produce the quality synthetic aperture radar (SAR) and inverse synthetic aperture radar (ISAR) images necessary to support automatic target recognition (ATR) software and controller validation of targets.
- In many situations, such as in Kosovo, highly restrictive rules of engagement will constrain attack options. Instead, high-resolution imagery and a human in the loop may be required to make the final determination to attack a target.
• In Kosovo-like situations, detecting and attacking enemy armored vehicles during the movement phase appears to be the most feasible of the various options, offering the potential to level the playing field for indigenous opposition forces.

• Relatively modest improvements (such as giving fighter crews air-dropped mini–unmanned aerial vehicles (UAVs) or deploying ground sensor networks) have the potential to produce operational and strategic effects against elusive maneuver forces, because such forces will typically and by necessity operate in ways that make them fairly easy to detect and recognize with such systems.

• In contrast, huge operational and technical uncertainties are associated with offensive operations against mobile ballistic or cruise missile forces. Mobile missiles operate in a manner vastly more difficult to counter than maneuver forces. Although we present ideas to counter mobile missiles, we want to emphasize that U.S. enemies have many cheap and simple countermeasures at their disposal. It is not clear to the research team at this point whether operational and strategic effects can be achieved through offensive operations against mobile missile forces.

• Advanced airborne or spaceborne radars, high-performance ATR software, stealthy UAVs, air-launched disposable unmanned aerial vehicles, air-inserted unattended ground sensors, autonomous munitions, and hypersonic missiles exemplify the kinds of technologies that will need to be developed before the USAF can field a robust capability against elusive targets.

• New technologies will not be sufficient to enhance USAF capabilities against elusive targets. Greatly streamlined control procedures and information integration will be necessary to ensure that once a target is detected, it can be confirmed as valid and attacked before it disappears.

• Although ATR software is vital to filter out the large number of false targets, a human decisionmaker will need to remain in the targeting loop.
FINAL THOUGHTS

In continuing to make the transition from the Cold War era to the new security environment of the twenty-first century, the Defense Department and services face a dilemma in force planning for the next decade or so. During this transition, the United States must have the capacity to defeat traditional conventional aggression in Korea and Southwest Asia—threats that are not cheap to counter: They require substantial force structure, as well as investments in readiness, modernization, and training. As it is, some significant shortfalls have developed, requiring additional funding in key modernization and readiness programs. Yet, these threats represent only one set of challenges facing the United States.

Recent operations in the Balkans are a reminder that the U.S. military can be called upon at any time to conduct a variety of stabilization and other operations for which conventional forces may not be suited. To enhance U.S. capabilities for future peace operations, modest investments must be made in sensor and weapon technologies similar to those discussed in Chapter Three. Although generally much cheaper than main battle tanks and front-line fighter planes, such systems nevertheless require the diversion of scarce resources from already-strained programs.

An even greater challenge than elusive maneuver forces is posed by the mobile missile threat. The enormity of the task and investment required make it impossible for the USAF to support a major new program in this area without increasing overall defense spending or making a major reallocation within the Department of Defense (DoD). The George W. Bush administration has made missile defense a priority, but, at the time this report was being finalized, the programmatic details were largely unknown. Also, it is not clear whether the administration will emphasize offensive and defensive operations against enemy missiles or defensive operations alone. It appears that the administration’s primary concern is countering threats to the United States and its allies from weapons of mass destruction (WMD) as opposed to those from conventionally armed tactical ballistic missiles.

In the meantime, the USAF can make important contributions in two ways:
• First, airmen are best prepared to appreciate, analyze, and articulate how an adversary might use an advanced missile force as an alternative to a traditional air campaign. Thus, the USAF can help educate the broader defense community about this potential threat, building support in the process for programs to counter it.

• Second, the USAF can take the lead in identifying key enabling technologies and, in partnership with DoD, funding those technologies. Robustly funded efforts in advanced ground moving-target indicator (GMTI), ATR software, UAVs, and advanced weapons can help determine which options have the most promise and prepare the way for a deployment decision if and when appropriate.

The challenge for the USAF is not that such missions are too difficult for it but, rather, that the opportunities for aerospace forces to contribute are expanding so quickly. U.S. leaders and regional commanders in chief (CINCs) are routinely turning to aerospace forces to accomplish missions that previously would have been considered impossible. Meanwhile, the R&D community is developing new sensors, platforms, and weapons that vastly improve the ability of aerospace forces to detect, recognize, and strike targets in a host of different environments. Finally, the services and analytic community are developing new concepts of operation that exploit these technologies to accomplish key operational tasks.

Whether the USAF takes the lead against the targets discussed in this book or other services step up to these particular challenges, we conclude that the technologies and concepts presented here are broadly representative of the types of aerospace capabilities the nation will require over the next several decades. Satellites and UAVs will provide broad situational awareness, disposable captive-carry UAVs will, on demand, provide high-resolution imagery for target recognition and battlefield damage assessment (BDA); ATR software will filter out many false targets; air-inserted unattended ground sensor networks will provide intelligence in areas difficult to monitor from the air; autonomous weapons will search for high-value mobile targets; and the combination of streamlined control procedures and
high-speed weapons will vastly shorten the targeting cycle. Aerospace forces that have these capabilities will be relevant—indeed essential—to joint operations across the spectrum of conflict.