Appendix A

Scenario Assessment

In order to assess the kinds of challenges that future contingencies might present the U.S., we designed an analytic process that would allow us to derive from a broad range of potential scenarios the critical battlefield situations that were important to combat outcomes and thus appropriate for close support analysis.

The theater-level scenarios we developed for this assessment included the following:

- A light force contingency in the Americas
- A light force contingency in Central Asia
- A major contingency in the Far East
- A major heavy force contingency in northcentral Europe
- A major heavy force contingency in Southwest Asia
- A peacekeeping contingency in the Balkans

A Delphi Approach to Scenario Assessment

Because this set of scenarios formed the basis for combat simulation assessments, each of which requires substantial time to develop, the specific situations were carefully selected rather than chosen randomly. Our approach to assessing these scenarios had three steps:

- Identify the fundamental characteristics that define and distinguish different scenarios and define the “scenario space.”
- Determine how well our scenarios cover the appropriate regions of this space and refine the scenarios as necessary.
- Determine which battlefield situations within these scenarios were important to combat outcomes and thus to close support analysis.

To aid us in this process, we have relied on the concept of scenario space and on an analytic technique to foment expert consensus known as the Delphi method.3

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1This scenario, dealing with instability in the Republic of Georgia, was originally included in the analysis. As actual events came to closely match the hypothesized situation described in the scenario, the scenario was dropped. This was due to the complications associated with conducting weapons system analysis in the context of an unfolding real-world political/military situation, and our judgment that we could capture most of the considerations in our peacekeeping and light force contingency scenarios.

2This scenario was initially considered as a major contingency in the Balkans. After the Delphi deliberations, it was decided that a peacekeeping contingency was more suited to our needs.

3Dalkey, 1971.
The Concept of Scenario Space

To understand what characteristics are desirable for systems that can provide close support in the new defense era, we need to test candidate systems against the full range of situations they may be called upon to deal with. We have chosen to rely on the fundamental characteristics that define and distinguish different scenarios, such as distance from the U.S., terrain, and opposing forces, as a means of insuring we consider truly different battlefield situations over a sufficiently broad range. In doing so, these characteristics could be thought of as defining the scenario space, the collection of potential future scenarios in which U.S. forces might be employed. Thus, each specific scenario in this space is described by its unique fundamental characteristics. Given this as our analytic construct, the operative question is, How can we actually characterize the scenario space and compare one scenario to another—in short, What are the specific characteristics defining this scenario space?

Using Fundamental Characteristics to Define Scenario Space

Our study enjoyed the advantage of being able to rely on a previous research effort undertaken as a “capital building” project at RAND. That study probed the question of what fundamentally distinguishes situations in warfare. As a result of our extensions to this analysis, the following characteristics were developed as being those that, when taken together, would largely determine the outcome of a conflict:

- Terrain
- Weather
- Deployment Distance
- Strategic Choke Points
- Air Infrastructure
- Ground Infrastructure
- Operations with a Coalition
- Time Available to Respond
- Air Threat Sophistication
- Ground Threat Sophistication
- Threat Size
- Nuclear Weapons
- Biological Weapons
- Chemical Weapons

These characteristics are defined and discussed in detail below. In the next subsection, we describe the way in which we used the characteristics and the scenario space they define to insure the adequacy of our selection and development of scenarios (and the specific battlefield situations found therein).

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4Davis and Finch, 1993.
**The Delphi: Refining Scenarios and Ensuring That We Realistically Cover the Scenario Space**

To conduct the scenario assessments we needed to know how well the 14 characteristic dimensions defined the scenario space, where in the space a particular scenario lay with respect to these dimensions, and how well we covered the region of concern. With regard to a particular characteristic, “covering the region of concern” means “how well do the scenarios describe the entire range of values from the worst conditions to the best conditions?” To develop this understanding, we needed a method for comparing scenarios along each of the characteristic dimensions; we selected a technique for eliciting and refining the group judgments of functional experts, known as the Delphi method. It has three features. The opinions of the members of the group are obtained in such a way that the responses are anonymous. Iterations are obtained by conducting systematic controlled feedback between decision rounds. Group opinion is defined as an appropriate statistical aggregate of the individual opinions in the final round. These features are intended to minimize the effects of dominant individuals, irrelevant communications, and group pressure encouraging conformity.

The Delphi methodology was developed at RAND in the mid-60s, has been further developed in the published works of Helmer, Dalkey and others, and was used extensively at RAND and in other corporate settings for forecasting technical, social, and economic futures. Some of the limitations of the approach are associated with the difficulty of picking enough real experts to provide statistical significance. In addition, the dropout rate tends to be high because many people underestimate the time and commitment required to complete the process. Each of these limitations played a part in our use of the Delphi methodology.

To address the issue of how our scenarios covered the scenario space and what modifications we needed to make to improve this coverage, we conducted a Delphi experiment with a group of defense analysis and scenario development experts at RAND. We presented them with written descriptions of the scenarios and asked them to evaluate the implications of each characteristic for each scenario. We gave them each a detailed description of what the scoring range from one to ten meant for each characteristic.

**A Summary of the Findings**

The Delphi methodology provided sufficient convergence that we could use the measures of central tendency to characterize the various scenarios and measure how well they in fact “covered the scenario space.”

The next step was to identify various stages of the battle situations that occurred frequently across the group of scenarios and that could be construed as being representative of the needs for future close support.

Using a group of experienced military operations analysts, each of whom had prior military service, a “map exercise” was run on each scenario. In these exercises, deployment, operational concepts, and the evolution of the campaigns’ engagements as a function of time were developed. Based on this detailed understanding of the scenarios, an assessment of recent combat experience, and previous detailed analyses of close support in armored warfare, we have chosen a set of battle situations in which close support might prove critical to battle outcomes because of

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5 Sackman, 1974.
the relative weakness of the U.S. and allied forces. The team found that the scenario analysis validated the findings of the two previous stages (the review of defense strategy and guidance, and the analysis of recent U.S. military involvement):

- **Supporting Allied Forces**—situations in which the U.S. was relied on to provide close support to allied forces that were deficient in these capabilities and often had shortfalls in the doctrine, training, and equipment necessary to effectively interface with the U.S. forces providing such support.

- **Supporting Light Infantry**—situations involving the employment of light infantry forces either because of their appropriateness to the terrain or because of their ability to be rapidly deployed in a crisis.

It also added a third category of critical battlefield situation in which close support might be critical to battle outcomes:

- **“Leading Edge” Problems**—situations associated with the early stages of the buildup of U.S. forces in a contingency.

The next subsection explains our approach and findings in detail.

### Experimental Design for the Delphi

As explained in the subsection outlining the study’s approach to scenario and battlefield situation development, a Delphi experiment was used to examine how well the scenarios outlined above covered the “scenario space” that we found important in close support analysis. We also used it to suggest improvements to the scenarios and to provide additional insights as to which battlefield situations within these scenarios were the most important for this analysis.

### What Defines and Distinguishes Future Scenarios

As explained previously, we have chosen to rely on the fundamental characteristics that describe and distinguish scenarios to define the scenario space we believe is important to regard for future defense analysis and, particularly, for the analysis of close support systems. The characteristics can be grouped into three categories: unlikely to change, potential for change, and likely to change.  

The first of these categories is essentially self-explanatory since the geography and location of the scenario set these characteristics. In fact, the need for different scenarios has been driven by a desire to cover a range of these types of characteristics. The second set of characteristics has some potential for change, particularly in the intermediate term as (for example) air bases or port facilities are constructed. The third grouping has scenario characteristics that are likely to be treated as variables in an analysis, because (for example) a range of warning times are plausible. The concept of using very different wars within a particular theater as a means to more efficiently

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6In assessing where a particular scenario stands in the scenario space, we have adopted the convention that awards higher scores for situations that represent an advantage for the U.S.
explore a range of the “scenario space” (e.g., with quicker, lower-cost setup time) matches well with this last group of characteristics.7

The Delphi was organized around a question concerning where each scenario fit with regard to the fundamental characteristics that describe and distinguish scenarios. Just as important to us was knowing the rationale for why the participants chose the ratings they did. Unfortunately, the scenario “Strife in the Balkans” was added to the study after the Delphi experiment was completed. We could not find an acceptable means for obtaining “Strife in the Balkans” results to include with the rest of the Delphi results.

It is perhaps easiest to describe the Delphi question, and what is represented by the score the Delphi participants provided, in the following paraphrase: What is your measure (from one to ten) of the U.S. ability to deal with the problems presented by terrain (for example) in this scenario. A scenario might score high or low based on U.S. capabilities or based on the size of the problem to be overcome. The assessment is a judgmental product of these two dimensions (problem size and level of U.S. capabilities). For each combination of scenario and characteristic, we plotted a frequency diagram of the response. We discuss each of these characteristics in detail below.

**Characteristics That Are Unlikely to Change**

Any scenario, by virtue of its taking place on (or near) the surface of the earth, has characteristics that can not be readily controlled by either of the adversaries—terrain, weather, deployment distance, and strategic choke points. Given the departure from the canonical NATO/Warsaw Pact scenario that has taken place recently, and the fact that the U.S. for all its technology can not change these characteristics, we must explicitly consider how U.S. forces will cope with them.

**Terrain.** Terrain has an important effect on combat operations in that it importantly influences the type of forces that are most appropriate for the conflict. If the terrain favors the use of weapons systems for which the U.S. enjoys an advantage over the adversary, the relative influence of this characteristic for a given scenario would be higher. Terrain should also be considered in the context of risk to U.S. forces. Even though the U.S. has weapons suited to the terrain, certain types, such as jungle or urban, involve an inherent risk during combat operations.

There are many potential quantitative measures of the physical characteristics of a given set of terrain. What these measures can not do, however, is provide a “net assessment” of whether this terrain provides a relative advantage for the adversary or presents problems that the U.S. has a good ability to overcome. It is the latter judgmental assessment that is needed in describing a scenario with respect to one of our fundamental characteristics. The Delphi judgments that were rendered showed that there was good consensus among the participants, although one rating showed Korean terrain as very favorable to the U.S., higher than the majority. One rating showed SWA terrain as moderately favorable to the U.S., lower than the majority. In general, the participants rated none of the terrain in the scenarios as “very difficult” for the U.S. forces.

**Weather.** The range of weather typical to the climate of a theater of conflict has a major effect on ground combat, maneuver, resupply, and air operations. Assessments of the effects of weather in a scenario must include any relative advantage the U.S. or an adversary enjoys during weather extremes that can be experienced in the region. It also must consider whether or not the adversary is likely to have the initiative (enabling him to choose advantageous weather to

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7Davis and Finch, 1993.
conduct his operations). If the adversary has no advantage or can not usefully choose to conduct operations in weather unfavorable to the U.S., the relative importance of this characteristic would be lower.

There is very good consensus among the Delphi experts with regard to weather. Although these scenarios incorporate vastly different weather, there is no case where the Delphi experts rated the weather as very difficult for the U.S. These scores may very well be due to the efforts put forth over recent years by the U.S. Army and the U.S. Air Force to develop all-weather capabilities.

**Deployment Distance.** This characteristic assesses the distance that the U.S. forces planned for use in the scenario would have to travel in order to reach the theater of operations. This includes movement within the U.S. as well as movement overseas, and should consider the difficulties associated with changing modes of transport along with capacity or other mode-unique limitations.

There is less consensus among the Delphi experts on this characteristic compared with the consensus concerning weather and terrain. The disagreements do not come from the rather deterministic assessment of the distance (for example, to Korea), but rather from the U.S. ability to cope with that distance, particularly when the deployment involves the need to move heavy divisions across the U.S. to depart from West Coast ports. In short, there is disagreement about the capability of U.S. sealift and airlift, particularly when multi-mode deployments are envisioned. These scenario scores cover the characteristic space with regard to deployment distance and emphasize the importance of this characteristic in scenario selection.

**Strategic Choke Points.** This characteristic describes the implications for the deployment of U.S. forces if their sea lanes to the conflict area must pass through a strategic choke point such as the Panama or Suez canals, the Strait of Hormuz, or the Bosporus. Air lines of deployment are affected by this characteristic in a similar manner. The obvious concern is the potential for U.S. forces to be subject to interdiction or delay in the choke points. (We have generally assumed that both means of deployment are necessary for an effective and timely insertion of forces, and that they are poor substitutes for one another.)

There is good consensus concerning the evaluations of how each scenario rates with respect to the problems presented by the characteristic “strategic choke points.” The disagreements that do exist do not come from the assessment of the existence of the choke point, but rather from the U.S. ability to cope with the opponent’s attempts to interdict the choke point. As with deployment distance, these scenario characteristic scores emphasize the importance of this characteristic in scenario selection.

**Characteristics That Have the Potential to Change**

A second class of characteristics can be changed over a sufficient period of time given enough resources and commitment from the involved governments. These characteristics include air infrastructure, ground infrastructure, operations with a coalition, importance of U.S. “heavy forces,” importance of U.S. “light forces,” air threat sophistication, ground threat sophistication, and threat size. As each characteristic is discussed in turn, the reader can speculate as to how an adversary could go about changing a characteristic.

**Air Infrastructure.** This characteristic describes how much infrastructure would be required for the U.S. air forces involved in the scenario to function effectively, and how much is available. If not much were required, then a scenario would rate high on this characteristic. If a great deal of infrastructure is required, but a lot is available, the rating would also be high, because these
situations are favorable to the U.S. This characteristic regards the infrastructure components that directly support air operations: airfields and the air traffic control system; to a lesser extent this includes the rail and road systems, as well as the power generation/distribution system (to the degree that these systems support air base operations). This characteristic (as well as the ground infrastructure characteristic) is important to analyze explicitly because we have grown accustomed to taking for granted the air (and ground) infrastructure that exists to support our forces in a NATO context. Most parts of the world will not support our sophisticated air and ground forces as well as Western Europe, so it is important when attempting to compute conflict outcome to understand how the performance of our forces will be degraded by the available infrastructure.

There is very good consensus among the Delphi experts on this characteristic for the Korean, Cuban, and SWA scenarios. The disagreements that do exist do not come from the assessment of the existence of the air infrastructures in Poland and Romania, but rather from the uncertainty about the implications for the air war if Russia enters the conflict.

However, discussion among the Delphi participants indicated that the capabilities of the U.S., as the world’s only remaining superpower, could render some problems as almost always tractable. For this characteristic, the view was that some combination of long-range operations, carrier basing, and reliance on neighboring allies’ air infrastructure would provide “work-arounds” adequate to prevent the problems presented by a limited air infrastructure from becoming critical. This suggests that the air infrastructure available in a scenario is not a particularly important characteristic when choosing situations to evaluate close support system characteristics.

**Ground Infrastructure.** This characteristic describes how dependent the U.S. ground forces are on infrastructure, and how capable the available infrastructure is. Again, if not much is required, or if a lot is required, but a lot is available, a scenario would rate high according to this characteristic, because the situations represent an advantage for the U.S. The characteristic considers the infrastructure components that are necessary to support the large force size typically associated with the employment of ground forces in a broad context: rail systems, roads, power generation and distribution, and seaports and receiving facilities.

There is generally good consensus among the Delphi experts with regard to this characteristic. The disagreements that do exist do not come from the assessment of the existing ground infrastructure in Poland, but rather from the uncertainty about the requirements for ground infrastructure if Russia should enter the conflict. The Delphi discussions noted that the U.S. is the only remaining superpower in the world and that the Gulf War was a dramatic example of the U.S. force’s ability to deal with the problems presented by a limited ground infrastructure. This suggests that the ground infrastructure available in a scenario is not a critical limitation on U.S. and allied capabilities.

**Operations with a Coalition.** This characteristic measures whether a coalition would benefit the U.S. politically at home or in the region, and how hard it would be to maintain the coalition and conduct military operations within the constraints imposed by the coalition.

There is fair consensus concerning the evaluations of how each scenario rates with respect to the problems presented by the characteristic “operations with a coalition.” The disagreements that do exist reflect the uncertainty about whether NATO will enter the scenario in support of the U.S. The views of the Delphi experts reflect the fact that the U.S. is the only remaining superpower in the world, and they believe that while a “go it alone” approach is awkward, U.S. forces can overwhelm any potential adversary without a coalition if necessary. This suggests that the
availability of a coalition in a scenario is not a particularly important characteristic when choosing situations to evaluate close support system characteristics.

**Need for/Importance of U.S. “Heavy” Forces.** Armor and mechanized infantry forces constitute the “heavy” forces and may be the most appropriate forces for a scenario depending on the terrain and the forces of the adversary. This characteristic was addressed to deal with the views of the constituency in the Army that feels that heavy forces can be dominant in most conflicts.

There is fair consensus among the Delphi participants in the belief that while heavy forces are important, the combination of U.S. light forces and U.S. air forces could overwhelm any potential adversary without heavy forces if necessary. This suggests that the availability of heavy forces in a scenario is not a particularly important characteristic when choosing situations to evaluate close support system characteristics.

**Need for/Importance of U.S. “Light” Forces.** Air assault, airborne, and light infantry forces may be the most appropriate force for some scenarios (or phases of a scenario) due to the nature of the terrain or the rapid deployment characteristics of these forces. The evaluations of how each scenario rates with respect to the problems presented by this characteristic were carried out to deal with the views of the constituency in the Army that feels that light forces can be adequate for most conflicts.

There is less consensus among the Delphi participants on this characteristic than on the need for heavy forces. In SWA, higher scores reflect the fact that light forces will be required to slow down the advance of the adversary in the early days of the scenario. The higher scores reflect the fact that as time progresses, heavy forces will be required to force the adversary out of territory that was initially occupied and to destroy the adversary’s ability to support offensive actions. Additional scenarios involving heavy jungle terrain or peacekeeping deployments to Africa or the Caribbean presumably would elicit higher scores for the importance of light forces.

The next three characteristics deal with the quality and quantity of the threat. We have separated the quality (sophistication) and quantity (size) in these characterizations of scenarios, recognizing that these characteristics may prove difficult to evaluate separately. (Regard the case of an adversary with a small number of highly sophisticated systems that the U.S. must carefully handle until they are eliminated—which it eventually does very well. While this might be viewed as a sophisticated threat that poses problems for the U.S. and warrants a low score, the sophistication is, in the end, limited by the small numbers involved.)

**Air Threat Sophistication/Adroitness.** This characteristic describes how appropriate the level of technological sophistication is for the adversary’s purposes in each scenario. It assesses the adroitness with which the adversary employs the technology that is available to him. If the two match well to the disadvantage of the U.S. forces, a scenario’s score on this characteristic would be lower. We have included air defenses and long-range surface attack missile systems in the air threat.

There is good consensus among the Delphi participants. The disagreements that do exist do not come from the assessment of the air threat sophistication/adroitness in Poland and Romania, but rather from the uncertainty about the implications if Russia should enter the scenario. It is not surprising that these scenarios do not cover the space very well. The U.S. is the only remaining superpower in the world, and the Gulf War was a dramatic example of the U.S. Air Force’s ability to dominate an opposing air threat. High scores are not so much a measure of low “air threat sophistication/adroitness” as they are a reflection of the belief that the U.S. air forces can overwhelm any existing air threat worldwide. This suggests that the “air threat
sophistication/adroitness” in a scenario is not a particularly important characteristic for scenario selection.

**Ground Threat Sophistication/Adroitness.** This characteristic describes the adversary’s ground forces in the same manner as was done for the air threat. For example, if the terrain is very rugged and has substantial cover (as in jungle terrain), the current state of military technology is such that infantry is still the most appropriate type of force to be used. The level of technological sophistication of infantry forces is not high in comparison to many other domains of warfare today, yet this level of sophistication would be highly appropriate if an adversary were adroit enough to use it in such terrain. Similarly, technically sophisticated weapons systems in the hands of an adversary not adroit enough to use them to their full advantage might pose less of a problem for the U.S. than an adversary equipped with more usable technology.

There is good consensus among the Delphi participants. The scores for Cuba do not reflect sophistication in the technological sense, but rather the belief that the Cuban troops may be effective fighters in the jungle, cane field, and village environments of this scenario. The scores for SWA reflect uncertainty about the quality of the equipment that Iraq would purchase to replace the equipment destroyed in the Gulf War. These low overall scores reflect the fact that the Delphi participants believe that the U.S. forces can overwhelm any potential adversary regardless of the sophistication of the ground threat. This suggests that the “ground threat sophistication/adroitness” in a scenario is not a particularly important characteristic for scenario selection.

**Conventional Threat Size.** This characteristic measures the consequences of the sheer size of the threat. If, as some have argued, the size of the adversaries in our scenarios is of little concern to the U.S. because of its qualitative advantage, then there should be little difference in this characteristic across the scenarios. The larger the size of the threat forces, the lower a scenario would fall on the scale for this characteristic, since this would represent a disadvantage for the U.S.

There is good consensus among the Delphi participants, but the scores indicate that the U.S. may experience a problem. These low overall scores reflect the fact that the U.S. may be facing the threat in the close proximity of the adversary’s country, and could face essentially his entire military infrastructure. This change is a logical consequence of the shift in strategic emphasis from central Europe (where we had substantial in-place forces) to potentially worldwide involvement.

**Characteristics That Are Likely to Be Variables**

Characteristics in this class are likely to be variable because they depend on decisions made by the adversaries in the conflict. Longer-term decisions to develop nuclear, biological, and chemical weapons and shorter-term decisions to employ such weapons are examples of such scenario characteristics because they depend on such a complex set of influences that they are unlikely to be predictable.

**Time Available to Respond.** As a practical matter, is the time available to the U.S. sufficient to allow the U.S. to respond adequately to the problem? If the time available is likely to be adequate to emplace the needed forces in the theater, a scenario rates high on this characteristic. Similarly, if adequate U.S. forces were already in place in the region, a scenario would rate more highly as to this characteristic than would scenarios that required the deployment of initial response forces.
The evaluations of how each scenario rates with respect to the problems presented by the characteristic “time available to respond” show good consensus among the Delphi participants. These scenarios do cover the space well since the measures of central tendencies vary from 10.0 to 1.5. This scoring behavior is a strong confirmation of the fact that the “time available to respond” is a very important determinant of how many and what type of U.S. forces can be employed in the conflict. This suggests that the “time available to respond” in a scenario is a very important characteristic for scenario selection, particularly because it is a decision that rests almost entirely with the aggressor.

**Nuclear Weapons.** If the enemy has nuclear weapons available and is likely to use them, and the resulting influence on U.S. initiatives would be pronounced, a scenario would rate low on the scale for this characteristic. The evaluations of how each scenario rates with respect to the problems presented by the characteristic “nuclear weapons” is shown in Figure A.1. There is very good consensus for the Cuban scenario based on the belief that Cuba will not have nuclear weapons available. There is uncertainty about the potential behavior of the Former Soviet Republic in the Poland and Romania scenario. However, there is wide uncertainty reflected in the Korea and SWA scenarios.

![Figure A.1 — How Each Scenario Rates as to Nuclear Weapons](chart)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Median</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
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<td>0.41</td>
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<td>8.00</td>
<td>7.50</td>
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</tr>
<tr>
<td>SWA</td>
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<td>4.67</td>
<td>3.39</td>
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Each of these totalitarian states is known to have sought to build a nuclear capability. Each is ruled by a despot leader, one of whom has used chemical weapons against an adversary as well as a segment of his own population. The lack of consensus invalidates the notion of “covering the space.” Further, it suggests that consensus might not be possible and that, where experts have such strongly held diverging views, the influence of the characteristics involved might be viewed as “unknowable” rather than “uncertain.” This suggests that the use of nuclear weapons in a scenario is a very important characteristic for scenario selection, particularly because it is a decision that rests almost entirely with the aggressor.

**Biological Weapons.** The characterization of a scenario with respect to biological weapons is governed by the same considerations used for nuclear weapons. The evaluation of how each scenario rates with respect to the problems presented by the characteristic “biological weapons” is shown in Figure A.2. There is no consensus view about the use of biological weapons in these...
This is due to the ease of obtaining these weapons and the fact that, unlike nuclear weapons, they do not destroy infrastructure. There is uncertainty about the potential behavior of the Former Soviet Republic in the Poland and Romania scenarios, but one Delphi participant in each case drives the spread of the judgments. However, there is wide deviation in the Korea and SWA scenarios due to the same conditions discussed for nuclear weapons.

<table>
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<tr>
<th>SCENARIO</th>
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Figure A.2—How Each Scenario Rates as to Biological Weapons

Once again the scoring suggests that consensus might not be possible and that, where experts have strongly held diverging views, the influence of the characteristics involved might be viewed as “unknowable” rather than “uncertain.” Clearly the use of biological weapons in a scenario is a very important characteristic for scenario selection, particularly because it is a decision that rests almost entirely with the aggressor.

**Chemical Weapons.** Scoring for chemical weapons is governed by the same considerations used for nuclear weapons. The evaluations of how each scenario rates with respect to the problems presented by the characteristic “chemical weapons” is shown in Figure A.3. There is no consensus view about the use of chemical weapons in these scenarios. This is partially due to the ease of obtaining these weapons and the fact that, unlike nuclear weapons, they do not destroy infrastructure. There is uncertainty about the potential behavior of Cuba and the Former Soviet Republic with respect to the use of chemical weapons. Also, there is wide deviation in the Korea and SWA scenarios. Each of these totalitarian states is believed to have a chemical weapon capability, and, as previously discussed for nuclear and biological weapons, each of their leaderships is unstable.
This uncertainty suggests that consensus might not be possible and that, where experts have strongly held diverging views, the influence of the characteristics involved might be viewed as “unknowable” rather than “uncertain.” Once again this suggests that the use of chemical weapons in a scenario is a very important characteristic for scenario selection, particularly because it is a decision that rests almost entirely with the aggressor.

**The Major Contribution of the Delphi Analysis: Leading Edge Problems**

Figure A.4 is a “stoplight chart” that shows how each scenario was rated on the fundamental characteristics and provides a sense of how the scenarios cover the scenario characteristic space. A standard deviation greater than 2.0 was judged not to have converged and was not assigned a color. A mean lying between 1 and 3.3 was assigned a color code of red and indicates a major problem for the U.S. A mean greater than 3.3 and less than 6.7 was assigned amber, indicating a moderate problem for the U.S. A mean between 6.7 and 10 was assigned light blue, indicating only minor problems. Light gray indicates that the data would not support an assessment (there was no consensus opinion by the participants). A number of interesting trends emerge: “air threat sophistication” is light gray across the board, suggesting that the participants view no air threat as being sufficiently sophisticated to cause the U.S. any difficulties. Similarly, the dark gray rating across the board for “ground threat sophistication” suggests that the participants view no ground threat as being sufficiently sophisticated to cause the U.S. any serious difficulties.
Problems faced by U.S. are minor

Scenarios

Fundamental Characteristic

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UNLIKELY TO CHANGE

Terrain
Weather
Deployment Distance
Strategic Choke Points

POTENTIAL FOR CHANGE

Air Infrastructure
Ground Infrastructure
Operations w/Coalition
Air Threat Sophistication
Ground Threat Sophistication
Threat Size

LIKELY TO CHANGE

Time Available to Respond
Nuclear Weapons
Biological Weapons
Chemical Weapons

Problems faced by U.S. are major
Problems faced by U.S. require attention
Problems faced by U.S. are minor

Figure A.4—Summary of Delphi Assessments

Only three characteristics were scored in the black: “strategic choke points” for the SWA scenario, “threat size” for the Korean scenarios, and “time available to respond” for the Korean and SWA scenarios. In 15 percent of the cells, the participants were judged not to have reached consensus on the scores.

The scenario analysis that we performed confirmed the finding from our independent analysis of the planning documents and other guidance used by DoD officials that providing support to allied forces would be a pervasive dimension of future U.S. military involvement. In fact, Figure A.4 shows that our defense experts believed that, in general, the requirement for U.S. forces to operate in support of allies would present “minor problems,” at worst, problems that would require “some attention.” The impact of this analysis on the remainder of the study was that in developing the combat vignettes that were used for detailed simulation-based analysis, a third of them involved supporting allies. In those vignettes, we investigated in detail the ways in which close support assets could support allies.

The historical analysis that we performed on the actual employment of U.S. military forces over the past 30 years shows a preponderance of evidence to support the growing importance of U.S. light forces in U.S. national security policy. The Delphi-based scenario analysis that we performed generally supported the concept of the use of these forces. On average, they were judged to be more rather than less important to the outcome, and, in at least one case, one might argue that their involvement was considered crucial. One problem that became apparent during the analysis after the Delphi experiment was concluded was that our Delphi experiment should have treated more explicitly the time phasing of the U.S. response to the threat posed by the scenario opposition. Due to the nature and the preconflict positioning of the Army and Marine light forces, they generally will be the first forces that are deployed to the region of concern. Whether or not they will be engaged before or after the closure of heavy forces is a somewhat complex decision on the part of the leadership of the contending powers. It is interesting to speculate on what the outcome would have been had the leadership of Iraq decided to engage the 82nd Airborne Division when it was virtually the only U.S. combat force on the ground in the region. Given the outcome of what did occur, a future despot must recognize that should he
practice aggression in a region, he has to be prepared to engage U.S. light forces, supported initially by land- and sea-based fixed-wing aircraft.

An interesting perception pervaded the discussions that occurred during the Delphi experiment and manifested itself in the results. This view could be summarized as: “When the United States employs the full range of its military forces it will be successful.” For example, it was clear that our experts believed that U.S. airpower would dominate any adversary in the world. It was their general belief that the U.S. could operate successfully with its allies and that U.S. light infantry forces had been adequate to their tasking over the years. Given this, the problem that remained was to try to understand the isolated places where our experts thought there could be problems upon which we should focus the analysis.

As we previously stated, only four combinations of scenario and characteristic were thought to cause “major problems” for U.S. forces: strategic choke points for the SWA scenario, threat size for the Korean scenarios, and time available to respond for the Korean and SWA scenarios. We sought a common thread running through these combinations and came upon “leading edge problems.” In each of these four combinations of scenario and scenario characteristic, it was a problem of the early inadequacies of the U.S. forces given the scenario setting. In fact, upon reflection, all but the most contrived situations have the potential for involving U.S. “leading edge” forces in combat, and often the decision is largely in the hands of the adversaries.

It is important to understand the distinction between “supporting light infantry” and “leading edge forces.” Leading edge forces are not necessarily light in nature, but merely lacking in some dimension that impedes their effectiveness. The problem may be inadequate C4I, shortage of given equipment, or supply constraints.

The leading edge problems have many of the characteristics of the previously envisioned battle environment: U.S. forces are outnumbered and on the defense, and often the adversary consists of heavy armored forces. Some conditions have changed in the new defense environment, however. There is a greater priority placed on first managing attrition and then finding a way to operate effectively.

While the capabilities and limitations of early deploying U.S. forces have always been a concern, understanding leading edge problems (such as the limited firepower and tactical mobility of our most rapidly deployable forces) and finding solutions to these problems (which may include augmenting early forces with close support firepower) may be of even greater importance in a contingency environment than in the past. This may be particularly true in that it seems prudent to assume that future adversaries may have learned well from Saddam Hussein’s mistakes in giving the U.S. the time to mass its combat power and build coalitions.

**Additional Findings**

In addition to arriving at the findings that have a direct impact on the question of what types of battle situations might critically rely on close support to ensure favorable battle outcomes, the study team developed an appreciation of what battle environments were overlooked in its initial selection of scenarios for the Delphi. These holes fell into two broad categories:

**Large Light Force Contingency.** The participants noted that the collection of scenarios used for the Delphi did not include a large light force conflict. Such a scenario might be cast as an extension of an existing scenario (the Iraqi army continues to offer resistance from bases in the swamp land surrounding the Tigris and Euphrates rivers upon defeat of their armored forces) or as a separate scenario (a conflict in Zaire or Peru, for example). A “jungle terrain” scenario could
provide the context for a “large light force contingency” and would provide the most demanding terrain environment for U.S. forces.

**Peacekeeping/Peacemaking Contingency.** The participants also observed that peacekeeping/peacemaking missions may have unique enough characteristics to warrant separate and specific inclusion. Some of the scenarios used in the Delphi (such as the conflict set in Romania) might also serve as a platform through which to examine peacekeeping/peacemaking issues. Somalia or Bosnia present themselves as candidates as well, but come with “baggage” that make them difficult to use in weapons systems analysis.

The development and analysis of additional theater-level scenarios was beyond the scope of the project; however, the remaining resources for this research did allow the study to capture many of the important aspects of the light infantry and peacekeeping scenarios developed at the tactical level for detailed analysis.

Other insights developed by the study team because of the structure and intensive nature of the Delphi discussions included several additional scenario characteristics that may be important in future assessments:

**Constraints on U.S. Operations.** Since U.S. forces have often had to operate under considerable political constraints (allowing the adversary sanctuaries, classes of targets that could not be attacked, etc.), some regard of these as fundamental characteristics of a scenario might be warranted.

**U.S. Objectives.** The range of different military objectives that the U.S. might pursue (defend territory; stabilize a regime; conduct offensive operations to eject an adversary, seize and hold territory, or destroy an enemy’s forces) can result in substantially different conflicts. Some regard of these as fundamental characteristics of a scenario might be warranted.

These factors were taken into account in designing the peacekeeping scenario and its associated tactical-level vignettes. They particularly influenced the selection of success criteria and the types of U.S. forces involved in the battles.