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Enhancing Fires and Maneuver Capability Through Greater Air-Ground Joint Interdependence

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Prepared for the United States Air Force

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Summary

This monograph describes PAF research focused on improving air-ground integration, interoperability, and interdependence. We propose a new joint warfighting concept and, using quantitative methods, demonstrate its potential to increase effectiveness during major combat.

Service transformation efforts and lessons learned during combat operations in Afghanistan and Iraq highlight both doctrinal and technical issues with air and ground integration. The key to enhancing future joint collaborative efforts is integrating airpower across the range of military operations, rather than merely deconflicting and parsing capabilities that should be available to the JFC. The challenge is to emphasize the strengths and retain the efficiencies that each service brings to the fight, rather than to subordinate one service to the other. Much of the impetus for change in how the military employs joint forces comes from the fact that airpower capabilities have improved dramatically in the past decade but that the joint warfighting potential offered by these capabilities is not being fully realized.

Therefore, the objective of this research is to provide a framework for thinking about how to improve the effectiveness and efficiency of joint air-ground operations. Our overall research goal was to develop options for military planners, doctrine writers, and force planners that would provide a more interdependent and joint construct for employing ground and airpower in the future. To this end, we propose several alternative options for improving the effectiveness of air and ground fires and maneuver to meet the JFC's objectives. We used the scenario of a meeting engagement with enemy mechanized forces during major combat operations to estimate the effectiveness of each option. We also

examined C2 organizations, procedures, and equipment to identify the changes necessary to realize the different options.

We used as a starting point past research that examined operations in Iraq (1991 and 2003), Bosnia (1995), Kosovo (1999), and Afghanistan (2001).¹ That research showed that a dramatic shift has occurred in the relative roles of ground and airpower in major operations and campaigns and that, while tactical and operational war-fighting campaign objectives were generally achieved rapidly, realizing desired U.S. strategic end states has required protracted stability, support, transition, reconstruction, and counterinsurgency operations that place heavy demands on U.S. ground forces. It also noted that fixed-wing aircraft are increasingly effective at operational levels but that there is still a demand for robust ground forces because of the many complex terrain challenges (urban, mountainous, jungle). It concluded that expanded operations across a range of operations and environments require greater service interdependence, which can be enabled by more effective and efficient integration of U.S. advances in intelligence, surveillance, and reconnaissance (ISR); precision strike; and other capabilities.

Expanding on the above concepts, we developed a framework of options that is structured in a way that bounds, by degree, levels of air-ground joint interdependence ranging from the construct implemented during Operation Iraqi Freedom (OIF) to a new construct that embraces enhancements across a number of pertinent dimensions. That framework and the associated analytics are described in this monograph.

We first examine a joint fires and maneuver option that builds incremental improvements into air-ground operations during the march to Baghdad in OIF. These operations were conducted across a large (and deep) area of operations (AO) (characterized by mostly

¹ David E. Johnson, *Learning Large Lessons: The Evolving Roles of Ground Power and Airpower in the Post-Cold War Era*, Santa Monica, Calif.: RAND Corporation, MG-405-1-AF, 2007.

closed kill boxes) controlled by the U.S. Army V Corps commander.² Within this AO, the Joint Force Air Component Commander (JFACC) allocated fixed-wing aircraft for CAS as prescribed by the ground commander. Beyond the AO, air operations were conducted by the JFACC in accordance with guidance and priorities of the JFC. We examine two incremental variations of this basic option (which we call Option 1A): considering the impact of opening kill boxes and reducing the size (depth) of the AO.

Next, we present a new joint fires and maneuver option (Option 2) that focuses on effects by implementing design elements specifically put in place to enhance the prioritization and synchronization of joint fires and maneuver to achieve the objectives of the JFC across the entire theater. Key features of Option 2 include the following:

- strengthening the relationship between the JFACC and Joint Force Land Component Commander (JFLCC) to achieve the JFC's goals
- replacing the fire support coordination line (FSCL) and other fire support coordination measures with a "surface-maneuver area," similar to the joint special operations area construct
- enhancing Air Force and Army operational and tactical interfaces at the corps and division
- replacing CAS and air interdiction distinctions with a counterland apportionment that is keyed to targets, kill boxes, or joint fires areas³
- authorizing the Air Support Operations Center (ASOC) to retask counterland missions for CAS as required from the counterland apportionment.

² Iraq was divided into "kill boxes," of 30 nm × 30 nm; each kill box was further subdivided into nine 10 nm × 10 nm "keypads." When no friendly troops were present, a ground commander could open a kill box or keypad to enable air interdiction. In the presence of friendly troops, the kill box or keypad was closed, requiring close air support (CAS) procedures. Kill boxes in the V Corps' AO during this period were generally closed.

³ In particular, Option 2 envisions no aircraft specifically allocated to CAS stacks.

To compare the potential effectiveness of each option, we developed a methodology that models the essential counterland air-ground interactions under discussion, based on a scenario that focuses on the disruption of enemy ground force maneuver. Employing this methodology, we examined each option's potential effectiveness. The analysis shows that prioritizing and synchronizing joint fires and maneuver (important Option 2 characteristics) offers important potential benefits and presents commanders with significant added flexibility for employing joint forces.

Our key findings include the following:

- Option 2 achieves the desired reduction in Red strength, requiring nearly 50 percent fewer aircraft than the next-best option (p. 49).
- Option 2 reduces the number of additional Blue ground forces needed (pp. 47–48).
- The penalty for failing to synchronize fires and maneuver can be quantified and can be as large as 55 additional aircraft (p. 49).
- If CAS stacks are desired as a hedge for the ground commander, Option 2 still requires significantly fewer aircraft than any of the Option 1 variants (p. 51).
- A sensitivity analysis based on nine variables shows that, in every case, Option 2 is able to achieve the goal of reducing Red force strength to 50 percent and can accomplish this goal with fewer aircraft than other options.⁴ Furthermore, under similar assumptions, the analysis demonstrates that, in many of the cases examined, the other options are unable to accomplish the goal regardless of aircraft force size (pp. 57–59).

After identifying the joint and Air Force C2 changes required to implement the options, the monograph concludes that Option 2 would require major changes in the organization and operations of the Combined Air and Space Operations Center (CAOC) (p. 63).

⁴ The nine variables are Red vehicle spacing, Red move cycle, Red vehicle speed, close combat effectiveness, jamming option, AO, air interdiction delay, available ISR, and C2 throughput at the coalition air operations center.

Enhanced C2 information systems are essential for realizing greater joint interdependence. In addition, increased joint force coordination of fires and maneuver will require net-centric data sharing at operational and tactical levels of command and control. All Option 1 variants are supportable with current information systems, but Option 2 is still beyond reach of the current and programmed organizational and systems structures; information system improvements are essential to realizing joint interdependence (pp. 69–73).

Findings and Recommendations

In summary, our findings are as follows (pp. 75–76):

- Current airspace control measures and ways of allocating air sorties suboptimize the application of aerospace power. The former are too restrictive; the latter result in unused (and therefore wasted) aerospace capacity.
- Modeling indicates that the most effective and efficient use of airpower requires expanding air access to the largest possible AO and consolidating CAS and air interdiction into a single counterland “flow.” Doing so effectively, however, requires improvements in the joint force’s net-centric command, control, and communications system capabilities—capabilities that are forecasted for 2011 at the earliest and are currently underfunded.
- In the meantime, incremental improvements to the joint force’s ability to expand air access to ground areas of operation are feasible and would increase effectiveness but would require adjustment to C2 practices.

We make the following recommendations (p. 76):

- Using the framework described here as a starting point, the Air Force should develop its own vision and framework for enhancing joint interdependence. This should be detailed across the pertinent DOTMLPF dimensions and should be informed by an

assessment of their impact on current and planned programs and by an assessment of risks, which should be aligned with any program impacts.⁵ Finally, the Air Force should begin to identify desired joint and component responsibilities. All these actions will benefit from additional research expanding on the methodologies described in this monograph. This research should evaluate, with greater scrutiny, the trade-offs in fires options (attack helicopters; GPS-guided multiple-launch rockets, high-mobility artillery rockets and artillery; fixed-wing aircraft) in the CAS—close combat zone and beyond.

- The Air Force should program within itself and advocate within the joint community the development of C2 organizations, procedures, and equipment that are necessary to achieve greater joint interdependence.
- The Air Force should use the framework of options described here as a basis for discussions with the joint community to address current tactical- and system-level issues that involve the joint community.⁶

⁵ DOTMLPF stands for doctrine, organization, training, materiel, leadership and education, personnel, and facilities.

⁶ Examples of topical issues include airspace control and deconfliction; fire support control measures including kill boxes, JFAs, and FSCLs; C2 arrangements that facilitate joint ISR, fires, and effects; jam-resistant, interoperable, and beyond line-of-sight communications systems; and joint interoperability based on net-centric data sharing between information systems.