

# Strategy Research Project

## Improving Air-Ground Operations on the Complex Battlefield

by

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United States Army War College  
Class of 2013

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**REPORT DOCUMENTATION PAGE**

*Form Approved*  
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

<b>1. REPORT DATE (DD-MM-YYYY)</b> xx-03-2013		<b>2. REPORT TYPE</b> STRATEGY RESEARCH PROJECT		<b>3. DATES COVERED (From - To)</b>	
<b>4. TITLE AND SUBTITLE</b> Improving Air-Ground Operations on the Complex Battlefield				<b>5a. CONTRACT NUMBER</b>	
				<b>5b. GRANT NUMBER</b>	
				<b>5c. PROGRAM ELEMENT NUMBER</b>	
<b>6. AUTHOR(S)</b> Lieutenant Colonel Alan Streeter United States Army				<b>5d. PROJECT NUMBER</b>	
				<b>5e. TASK NUMBER</b>	
				<b>5f. WORK UNIT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Commander John J. Patterson VI Department of Military Strategy, Planning and Operations				<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> U.S. Army War College 122 Forbes Avenue Carlisle, PA 17013				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b>	
				<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b>	
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b> Distribution A: Approved for Public Release. Distribution is Unlimited.					
<b>13. SUPPLEMENTARY NOTES</b> Word Count: 7,445					
<b>14. ABSTRACT</b> The U.S. military has relearned many lessons in air-ground integration while conducting small unit, decentralized operations on a complex battlefield. The projected environment that the military will operate in over the next twenty years will likely be more interconnected, the threat more capable, and the conditions equally unstable. Changes must be made to our leader and JTAC training and education programs to develop the attributes and skills necessary to meet the challenges of the future operational environment. Leader education must produce leaders who have expertise, are agile, adaptable, and tenacious, and who place trust in their subordinates in order to effectively conduct AGI and maximize the potential effects of responsive, agile assets. JTAC training must produce JTACs who are masters of their craft, able to rapidly develop innovative attack solutions in order to defeat an elusive enemy and minimize collateral damage. In order to meet the requirements of the future Joint Force, the Army must develop an organic capability to coordinate and execute air-ground operations. The result will be an agile, flexible, rapidly deployable Army that can rapidly integrate and decisively execute on a complex battlefield.					
<b>15. SUBJECT TERMS</b> JTAC Training and Certification, Leader Attributes, Air-Ground Integration, Asymmetric Threat					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>  UU	<b>18. NUMBER OF PAGES</b>  42	<b>19a. NAME OF RESPONSIBLE PERSON</b>
<b>a. REPORT</b> UU	<b>b. ABSTRACT</b> UU	<b>c. THIS PAGE</b> UU			<b>19b. TELEPHONE NUMBER (Include area code)</b>



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## **Abstract**

Title: Improving Air-Ground Operations on the Complex Battlefield

Report Date: March 2013

Page Count: 42

Word Count: 7,445

Key Terms: JTAC Training and Certification, Leader Attributes, Air-Ground Integration, Asymmetric Threat

Classification: Unclassified

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## **Improving Air-Ground Operations on the Complex Battlefield**

There are well-established training and certification programs for air-ground combined arms operations in mid and high intensity conflict. We have learned or relearned many lessons during the last eleven years of war and identified significant gaps in Air-Ground Integration (AGI) and employment in counterinsurgency operations. The decentralized, asymmetrical nature of current operations requires more agile, adaptive leaders and units that are resourced with trained and certified Joint Terminal Attack Controllers (JTACs) at the small unit level. Based on the projected threat and the vision for the Joint Force articulated in the Department of Defense strategic guidance, the nature of future U.S. conflicts in the short term will not change. The U.S. military must revise its training programs, to include manning, leader training, technical training, and certification, in order to effectively conduct air-ground combined arms operations on this complex battlefield.

### **Nature of the Complex Battlefield**

The modern battlefield is extremely complex, significantly complicating the effective employment of air assets in support of ground operations, as well as the achievement of the commander's overall mission objectives. While there are multiple, distinct Operational Environments<sup>1</sup> (OE) throughout the world in which the military may be called to operate<sup>2</sup>, there are common characteristics associated with each OE that specifically affect air-ground operations: the number of actors, the nature of the human terrain, the nature of the threat, the nature of the physical terrain, the rules on the use of force, and the number of sensor/shooter platforms and capabilities.

## Number of Actors

There are a significant number of actors, state and non-state, friendly, neutral, and enemy, conducting activities on the modern battlefield. Joint, Interagency, Intergovernmental, and Multinational (JIIM) Forces, Non-Governmental Organizations (NGO), Private Volunteer Organizations (PVO), International, and Private Security Organizations (PSO), tribes, clans, ethnic groups, media, multinational corporations, criminal networks, insurgents, and terrorists all interact to produce the complex environment. Friendly and neutral actors each have their own goals and objectives, which may or may not support U.S. interests.<sup>3</sup> The effects of their activities on the dynamics of the OE are both difficult to predict and measure even if you understand the separate goals and objectives. Coalition force pilots have varying degrees of proficiency in the English language, and they must each adhere to their national constraints and limitations, significantly affecting the responsiveness and precision of fires.<sup>4</sup> PSOs that dress, carry weapons, and employ tactics that closely resemble insurgent force activities consistently operate on the battlefield. Media organizations and civilians with cell phone cameras abound on the battlefield documenting events and publishing them instantly to a global audience.<sup>5</sup> Criminal organizations gravitate to weak and failed states,<sup>6</sup> and often network with insurgent or terrorist organizations to advance their interests.<sup>7</sup> Multiple insurgent and terrorist groups, sometimes in support of and sometimes at odds with each other, conduct activities using the civilian population to mask their execution and intent.

Based on guidance from the Secretary of Defense and Chairman of the Joint Chiefs of Staff (CJCS), the U.S. will endeavor to conduct operations with the interagency, partners, and allies in future operations whenever possible.<sup>8</sup> As the OE

takes on an increasingly transnational dynamic, where actors external to a region significantly impact conditions within it,<sup>9</sup> the number and interaction of actors grows and the difficulty in distinguishing between types and motives of future actors will increase.<sup>10</sup> It will become increasingly difficult to understand the dynamics of the OE and to develop operations to effectively influence it to accomplish the commander's overall mission and achieve unity of effort among friendly forces.

### Nature of the Human Terrain

There are multiple characteristics of the human terrain that complicate the modern battlefield. Demographically, the world population is projected to grow 60 million people per year and to reach 8 billion total by 2030, with population growth in the Middle East and Sub-Saharan Africa expected to exceed economic capacity to support it.<sup>11</sup> The World Bank estimates that while the middle class is expected to grow from 7.6% of the global population to 16.1% by 2025-2030, mostly based on increases in China and India, 63% of the world will be classified as poor and worse off than today.<sup>12</sup> Competition for energy in developing nations will double without projected global resources to fill the need.<sup>13</sup> Additionally, the competition for food will increase in areas where population growth exceeds the regions' capacity to meet the need compounded by the effects of lack of arable land, desertification, and lack of rainfall,<sup>14</sup> and competition for water will grow in developing nations with high population growth and high pollution.<sup>15</sup> Population growth among 15-24 year olds in the Middle East, South Asia, and Sub-Saharan Africa, exacerbated by high unemployment, creates a large pool for insurgent and terrorist recruitment.<sup>16</sup> Combined, these conditions will drive instability, and add a significant layer of complexity in the regions that the military will most likely be employed.

“Ubiquitous access to information technologies,”<sup>17</sup> to include almost universal access to cell phone cameras and the internet,<sup>18</sup> will increase transparency of events in the OE and empower individual actors to influence and potentially control the strategic narrative.<sup>19</sup> Instant access to the internet,<sup>20</sup> compounded by the capability to digitally alter photographs and video,<sup>21</sup> allows individuals and adversaries to influence popular perception, rapidly mobilize protests<sup>22</sup> and mobs,<sup>23</sup> and turn otherwise inconsequential actions into matters of strategic importance.<sup>24</sup>

The condition of the human terrain on the complex battlefield impacts the commander’s ability to accomplish his/her mission. These conditions combine to increase instability, make the civilian population more susceptible to recruitment and manipulation by insurgents and terrorists, and make it more difficult to gain support and credibility for the host nation government and security forces and coalition forces. These conditions permit the enemy to embed deeper into the civilian population, making them more difficult to identify and target, and potentially decrease friendly units’ freedom of maneuver and ability to employ fire support based on the risk of collateral damage and increasingly negative population reaction.

### Nature of the Threat

There is a vast array of threats U.S. forces may face on the complex battlefield, ranging from state conventional and irregular forces to non-state actors, paramilitary forces, proxies, insurgents, criminal organizations, terrorists, and technologically empowered individuals.<sup>25</sup> Insurgents, terrorists, and criminals are often networked, sophisticated, and connected transnationally to external actors, and have the potential to challenge conventional militaries.<sup>26</sup> Organized crime is expected to increase globally, and in alliance with non-state actors, is expected to significantly influence economic and

political systems.<sup>27</sup> Violent extremists are still considered the primary adversary to the U.S. and its allies, and these organizations will continue to operate in ungoverned, complex terrain.<sup>28</sup> The terrorist organization al-Qa'ida, for example, has become decentralized and has developed regional affiliates that continue to plan and conduct attacks against U.S. interests.<sup>29</sup>

Threat organizations have a wide array of capabilities based on their support and access to resources. Mid-weight and well-resourced non-state actors have the capability to develop effective cyber and space weapons, precision munitions, ballistic missiles, and anti-access and area denial systems.<sup>30</sup> Less well-resourced threat groups will employ improvised weapons and improvised explosive devices (IEDs), low cost GPS jammers, homemade radio frequency weapons, rudimentary robotics,<sup>31</sup> radar scattering, landlines, couriers, Rocket Propelled Grenades (RPGs), and anti-tank missiles.<sup>32</sup>

Threat groups will employ technology that allows them to overcome or avoid U.S. military capabilities and exploit its weaknesses, and will forgo the purchase of expensive conventional military tanks, aircraft, and ships.<sup>33</sup> Threat groups possess technologically advanced weapons such as tandem-warhead anti-tank guided missiles, sophisticated electronic warfare, communication and encryption devices, and air defense missiles that are equal to or exceed the capability of like U.S. systems. Advances in the development of nano-technologies will soon provide adversaries the ability to target U.S. communications, intelligence and surveillance, and visualization systems.<sup>34</sup>

Both state and non-state actors actively pursue nuclear, radiological, biological, and chemical weapons capability,<sup>35</sup> and Joint Staff analysis in 2012 predicted there is a

high likelihood that Weapons of Mass Destruction will be used within the next 25 years by a radical, non-state organization.<sup>36</sup> Mr. James Clapper, the Director of National Intelligence, stated during Congressional testimony in January 2012 that violent extremists would be able to conduct a chemical, biological, or radiological attack within a year.<sup>37</sup>

Threat organizations will employ a hybrid strategy using a combination of regular and irregular forces, terrorist, and criminal elements<sup>38</sup> conducting a full range of military and criminal actions, to include theft, murder, assaults, sniping, bribery, and cyber attacks.<sup>39</sup> They will conduct decentralized operations to attack U.S. forces and facilities throughout the depth of the OE to inflict casualties and drain U.S. military and economic resources and to draw the U.S. into a protracted conflict to defeat our national will rather than attempt to defeat us militarily.<sup>40</sup> Threat organizations will employ an adaptive strategy that minimizes the advantages of U.S. firepower, mobility, and high tech airborne Intelligence, Surveillance, and Reconnaissance (ISR) and strike assets,<sup>41</sup> and will operate in restrictive and rugged terrain to avoid decisive engagement.<sup>42</sup> They will use urban terrain and the civilian population to hide, mass, and disperse forces, and to make U.S. forces risk significant collateral damage if they respond to an attack,<sup>43</sup> and will fight unconstrained by international laws of war.<sup>44</sup>

Threat organizations wear civilian clothes and travel on foot, on motorcycles, or in civilian cars or trucks with their weapons and munitions hidden to make identification difficult, preserve their freedom of movement, and allow them to fight at the time and place of their choosing. They fight from positions that provide stand-off from U.S. forces using direct fire, indirect fire (IDF) and IEDs, that provide cover from direct fire, and that

have covered escape routes to prevent decisive engagement and to neutralize U.S. technological and firepower overmatch. Threat organizations normally conduct short engagements with 3-10 man elements that break contact before U.S. forces can bring IDF or airborne strike platforms to bear, but retain the ability to mass forces to conduct attacks against vulnerable targets such as isolated combat outposts and logistics convoys navigating restrictive terrain where they can achieve a decisive tactical victory with little risk of decisive engagement. Threat organizations employ a robust intelligence and early warning system that is difficult to defeat and makes maneuvering ground forces undetected to a position of advantage over the threat difficult.

The vast array of threats and threat capabilities significantly increases the complexity of the modern battlefield. Threat organizations will employ capabilities and tactics that seek to neutralize U.S. military advantages, make it extremely difficult to identify, target, and defeat them, and that engender protracted conflict to erode our national will. Threat tactics invite the potential for civilian casualties and unacceptable levels of collateral damage, and will challenge the discipline and precision of U.S. fires.

#### Nature of the Physical Terrain

The rugged, restrictive nature of the terrain in which threat organizations often choose to conduct their activities significantly increases the complexity of conducting combat operations on the modern battlefield, particularly with regard to AGI. Terrain varies from vast open deserts to steep, rugged mountains and each area presents its own unique challenges.

Desert terrain is characterized by miles of flat, arid, sandy terrain interspersed with areas of rolling hills or sand dunes. While predominantly used for transit by insurgents and terrorist groups, areas of hilly terrain provide threat groups cover from

ground observation as they emplace IEDs along routes frequently travelled by coalition forces. While easy to identify personnel moving by car or motorcycle in the desert, the U.S. lacks sufficient airborne ISR assets or ground based patrols to persistently cover the vast area required.<sup>45</sup>

Steep mountainous terrain contains parallel running ridgelines, spurs, and valleys, and elevation changes that can exceed 3000-5000 feet from the valley floor. Vehicle movement off road is not possible, foot movement is slow and physically demanding, and the compartmented nature provides easily accessible covered escape routes. If vegetation is present, it is generally sparse, providing adversaries multiple covered and concealed firing positions on high ground that afford good observation and fields of fire at effective stand-off range from U.S. forces.<sup>46</sup> Limited, unpaved roads wind through steep, switchback terrain, and are vulnerable to IED emplacement. Small groups of civilians transit the terrain collecting firewood or herding sheep and can easily be confused for insurgents transiting or conducting operations.

Cities offer dense population and dense vertical development that allow threats almost complete anonymity. Smaller towns and agricultural areas are heavily populated and located in close proximity to one another limiting the size of engagement areas and providing multiple covered and concealed fighting positions. Agricultural fields provide fields of fire and stand-off capability. Irrigation wadis 10-30 feet deep divide the landscape and have limited crossing points severely restricting heavy vehicle movement, and providing covered firing positions and covered escape routes. Unimproved dirt roads lace agricultural areas and towns and frequently support only

motorcycle and small vehicle traffic.<sup>47</sup> Small hedgerows sporadically line riverbeds and irrigation ditches providing concealment for movement.<sup>48</sup>

While each of these areas have unique terrain, they all have similar characteristics that provide adversaries the ability to avoid our conventional warfighting advantage and exploit our weaknesses. These unique aspects make it very difficult to find, fix, maneuver on, and defeat adversaries, and very difficult to effectively employ IDF, Close Combat Attack (CCA), or Close Air Support (CAS) without causing unacceptable collateral damage or injuring the civilian population. Extreme elevation changes in mountainous regions significantly increase the difficulty to estimate the location of enemy forces and the potential for large Target Location Error (TLE).<sup>49</sup>

#### Rules on the Use of Force

Army Doctrine and guidance published by senior commanders, designed to protect civilian populations and facilitate accomplishment of the military's overall objectives in operations on the low end of the spectrum of armed conflict, add a layer of complexity to the modern battlefield. Documents such as GEN Petraeus' Tactical Directive require the U.S. military to apply discriminate use of force to minimize collateral damage and protect the population from injury or death. While it directs U.S. forces to tenaciously pursue the Taliban, it requires commanders to determine that no civilians are present in a target area before conducting a strike and prohibits the use of fires if they cannot.<sup>50</sup> The Army Field Manual for Counterinsurgency Operations states that commanders should use the minimum amount of force required to accomplish the mission and prevent unnecessary loss of life or suffering.<sup>51</sup> The Law of Armed Conflict requires that commanders employ fires that are discriminate<sup>52</sup> and proportionate.<sup>53</sup> Adversary groups understand these constraints, and use them to gain an advantage

over U.S. forces by operating in and around the civilian population and by making their ability to use fires more difficult.<sup>54</sup>

### Number of Sensor/Shooter Platforms and Capabilities

The number of ISR and airborne fixed wing and rotary wing strike platforms available to the commander on the modern battlefield significantly increases his capability to identify and engage threat forces while simultaneously adding a significant layer of complexity. Each of these platforms has unique capabilities and limitations that the commander and fire support personnel must understand in detail in order to properly integrate and synchronize them to effectively engage a target. Ground based ISR platforms include Persistent Threat Detection System (PTDS), Cerberus, and Rapid Aerostat Initial Deployment (RAID) camera systems, Ground/Vehicle Laser Locator Designator (G/VLLD) and Long Range Advanced Scout Surveillance Systems (LRAS3), and radar systems that detect indirect fire points of origin. Airborne ISR platforms include Raven, Puma, Shadow, Warrior-A, and Predator Unmanned Aerial Sensors (UAS), OH-58D and AH-64 helicopters, and A-10, F-15E, F-16, and F/A-18 aircraft. Each of these assets has unique capabilities in terms of where and how far it can see, the resolution of its optics, whether it can observe in limited visibility, and how long it can be on station.

Airborne strike platforms include OH-58D and AH-64 helicopters, A-10, F-15E, F-16, B-1, and F/A-18 aircraft, and Warrior-A and Predator UAS platforms. While each of these platforms has unique capabilities in terms of its optics, speed, agility, altitude, accuracy of weapon systems, and method of attack to engage targets, they also carry a variety of weapons payloads with their own unique characteristics of accuracy, time of flight, and collateral effects radius. Commanders and fire support personnel must be

prepared to actively synchronize multiple ISR and strike platforms, likely conducting multiple battle-handovers of a moving target between platforms as it moves in and out of the observation capability of each asset, in a rapidly changing environment before being able to meet the conditions required to strike the target.

### Mission and the Joint Force

Based on the projected nature of the threat, fiscal constraints, and the role of the U.S. military in achieving our national security interests, the Secretary of Defense and CJCS have published guidance on the primary missions of the military and a vision of the future joint force that will be developed to accomplish those missions.<sup>55</sup>

#### Missions

The Secretary of Defense has directed five missions for U.S. military forces that will drive employment of the U.S. Army. The first is to conduct Counter-Terrorism (CT) and Irregular Warfare (IW) to disrupt, defeat, and dismantle al-Qa'ida and prevent Afghanistan from becoming a safe haven for violent extremists through a mix of direct action and security force assistance operations. The second is to deter and defeat aggression with the ability to fight a large-scale conflict in one region and deny the objectives of an opportunistic aggressor in a second region. The third is to provide a stabilizing presence through continuous, rotational deployments in order to deter adversaries and to build the capacity and competence of our allies and partners for both internal and external defense. The fourth is to conduct stability and counterinsurgency operations with coalition forces. The fifth is to conduct humanitarian assistance, disaster relief, and other operations to assist lead relief agencies providing aid to victims of natural and man-made disasters and to protect the safety and well-being of citizens of both the U.S. and other countries.<sup>56</sup>

Conflict, post-conflict, humanitarian, disaster, relief, and support and reconstruction operations will likely occur simultaneously, integrated with a variety of civilian organizations, and alongside NGOs, PVOs, and humanitarian organizations.<sup>57</sup> Missions will require the capability to secure populations, protect infrastructure, strengthen institutions, prevent conflict, and prevail in war.<sup>58</sup> U.S. military forces will be required to conduct wide area security, develop situations in close contact with the enemy and civilian population, and be able to achieve desired effects with minimal collateral damage.<sup>59</sup> Whenever possible, innovative, low-cost, and small-footprint approaches will be developed to achieve national security objectives.<sup>60</sup>

#### Vision for the Joint Force

The future Joint Force will be rapidly deployable,<sup>61</sup> agile, flexible, and ready to conduct a full range of contingencies.<sup>62</sup> It will be smaller, leaner, technologically advanced, and able to exploit its technological, joint, and networked advantages over the enemy.<sup>63</sup> In it, separate services will become truly interdependent.<sup>64</sup>

The future Joint Force will be globally postured and conduct globally integrated operations. Military forces will be quickly combined across domains and echelons, with each other and with mission partners, to project decisive military force. They will “form, evolve, dissolve, and reform in different arrangements in time and space with significantly greater fluidity than today’s Joint Force.”<sup>65</sup> The Joint Force will effectively partner with interagency organizations, multinational military forces, indigenous and regional stakeholders,<sup>66</sup> and ensure security with smaller conventional ground forces.<sup>67</sup> Services will be required to standardize Tactics, Techniques, and Procedures (TTPs) across Combatant Commands to facilitate rapid integration of forces,<sup>68</sup> and units must

be enabled to employ precise, discriminate fires to minimize collateral damage and the adversary's ability to exploit Joint Force operational mistakes.<sup>69</sup>

Based on fiscal constraints, many advancements in joint capability and interdependence will be made through innovations in training, education, and personnel management.<sup>70</sup> Jointness will be driven "deeper, sooner in capability development, operational planning, and leader development."<sup>71</sup> Changes in doctrine, training, and organization will make services inherently interoperable.<sup>72</sup> Services will emphasize organizational flexibility, and conduct habitual joint training to build competency, trust, and teamwork.<sup>73</sup>

#### Air-Ground Operations as a Critical Enabler

Based on the nature of the complex battlefield, the missions the military will be directed to conduct, and the nature of the future Joint Force, the capability to conduct effective air-ground operations will be critical to successful accomplishment of military objectives and to protect the force. Projected missions will be performed predominantly by small units conducting decentralized operations in inherently unstable, volatile OEs where conflict with threat forces can occur without warning. Responsive airborne fire support platforms rapidly increase combat power, giving the ground commander the ability to decisively engage adversaries across the depth of their force and protecting a potentially vulnerable small unit. Flexible, agile airborne platforms are often the only assets capable of tracking, fixing, and destroying highly mobile enemy forces that exploit complex terrain to avoid decisive engagement by U.S. ground forces. Precision fires provide the commander the capability to effectively engage enemy forces in complex terrain, in close proximity to civilian population, while minimizing collateral damage or the risk of civilian casualties and the associated negative effects to overall

mission accomplishment. Employed for ISR, airborne platforms significantly increase the commander's situational awareness of his area of operation, facilitating pattern analysis of enemy and civilian activity, facilitating identification and targeting of enemy personnel, and providing early warning of enemy attack.

#### Attributes and Skills for Leaders and Terminal Controllers

Current joint and service formal training and education programs for leaders and JTACs do not adequately prepare them to effectively conduct air-ground operations on a complex battlefield. While Army Doctrine Reference Publication (ADRP) 6-22 describes the attributes and core competencies expected of Army leaders overall,<sup>74</sup> there is no articulation of the leader attributes required for AGI in Joint or Army doctrinal manuals. Joint and service specific leader and JTAC training schools effectively train students in the technical requirements for AGI, but do not prepare them for the complex challenges of the modern battlefield.

#### Leader Attributes and Skills

There are five critical attributes leaders must possess in order to effectively conduct air-ground operations on the modern battlefield. The first attribute is expertise.<sup>75</sup> Leaders must understand the employment of CAS and CCA in terms of the tactical knowledge of how to employ them and technical knowledge associated with the capabilities and limitations of aircraft and their weapons and munitions. Leaders must understand the methods of target identification and designation and the capability of the supporting aircraft's sensors to observe, track, and engage targets. They must understand how much time it will take the aircraft to engage the target based on the aircraft's agility, weapons and munitions payload, and time of flight of the weapon to strike the target once it leaves the aircraft. Leaders must understand the effects of the

aircraft's weapons, accuracy of fires, and the collateral effects radius of the weapons and munitions. They must know the effects of TLE, terrain, weather, and elevation on the accuracy of fires. Leaders must understand the science of AGI in order to effectively integrate and synchronize air, ground, and indirect fire assets, destroy targets, and minimize the risk of collateral damage, civilian casualties, and fratricide.<sup>76</sup>

The second attribute a leader must possess is agility. ADRP 6-22 defines agility as flexibility of the mind, the ability to anticipate or adapt to uncertain or changing situations, and the ability to think through second- and third-order effects.<sup>77</sup> Leaders employing CAS on a complex battlefield must be able to rapidly manage multiple ISR and strike platforms in a very dynamic environment to identify and maintain Positive Identification (PID) of a moving target. They must be able to repetitively anticipate engagement area locations, based on the supporting aircraft's capabilities, weapons, and munitions, in order to provide time to align that strike platform for engagement of the target. Finally, the leader must be able to continuously assure that the air and ground in the vicinity of anticipated engagement areas are clear of friendly forces and civilians as a mobile, unpredictable enemy traverses a large geographic area, frequently crossing multiple unit boundaries.

The third attribute a leader must possess is adaptability. Adaptability is defined as the ability to readily adjust to different conditions.<sup>78</sup> While there are similar categories of characteristics that make OEs complex, each OE has unique challenges to the employment of air-ground fires with regard to the nature of the terrain, population density, conditions and threat organizations. Most areas of operation have multiple varieties of complex terrain, and leaders must be prepared to be rapidly reassigned to

conduct operations in new operational environments. Leaders are required to rapidly understand the nature of their assigned operational environment and develop innovative solutions for the successful employment of air-ground operations in it.

The fourth attribute a leader must possess is tenacity. Tenacity is the ability to maintain focus on an objective without giving up or becoming discouraged.<sup>79</sup> The complex nature of the modern battlefield makes the conduct of air-ground operations extremely challenging. Leaders must be prepared to persistently track and pursue enemy forces, repetitively conduct battle handover or targets between multiple combinations of ISR and airborne strike platforms, and successively align strike assets for target engagement before meeting the conditions that will allow the requirements of directed Rules of Engagement (ROE) to be met. This process may take hours or days, however the standards of precise, disciplined employment of CAS and CCA must be maintained to effectively destroy the target without causing unacceptable collateral damage or causing civilian casualties.

The final attribute a leader must possess is trust. The ability to effectively empower subordinates in accordance with the principles of Mission Command significantly increases the effectiveness of air-ground operations. Leaders must know the capabilities and limitations of their subordinates and JTACs, and empower those that display requisite competence, judgment, and comprehension of commander's intent, Tactical Directives, and ROE to directly employ CAS on the battlefield. Commanders must also transmit their intent for the desired effects of fires on a target to their JTAC and then entrust the JTAC, in coordination with the pilot, to develop the engagement solution.<sup>80</sup> Commanders must approve the engagement plan before

execution to ensure it meets his or her intent, and that it does not cause unacceptable collateral damage or civilian casualties. Release authority for air-ground fires must remain at the lowest level possible to ensure maximum responsiveness of fires and capability of the commander to accomplish the assigned mission.<sup>81</sup>

In addition to the attributes that leaders must possess to successfully conduct air-ground operations, there are three skills that will significantly improve AGI effectiveness. First is the ability visualize their current engagement in space and time, as well as the ability to anticipate the enemy's reaction and the time and location of a subsequent engagement. Leaders must be able to visualize how the actions and effects of air and ground ISR platforms, air and ground fire support platforms, friendly ground forces, enemy combatants, and the civilian population all interact together on the complex terrain to picture how the engagement will occur and how to best integrate all direct and indirect fire support platforms simultaneously to shape the battlefield and destroy the target.<sup>82</sup> They must simultaneously process the requirements for the use of force – continuous PID of an enemy threat, proportionality, discrimination, and collateral damage assessment – to ensure that they direct an effective strike that adheres to the ROE and Tactical Directives. They must understand the intent of the ROE and Tactical Directives and be prepared to apply that to unclear, ambiguous situations that don't clearly fit descriptions within the guidance.<sup>83</sup> Leaders must have thought through the nuanced conditions that would warrant the request of fires that would cause extensive collateral damage or potential civilian casualties prior to mission execution. Finally, they must be able to anticipate the enemy's reaction and the time and location of the

subsequent engagement so that they can position forces and align fire support assets to destroy the enemy at that location.<sup>84</sup>

The second skill that leaders must develop is the ability to articulate a clear, concise picture of the situation on the ground to a pilot in an airborne ISR or strike platform and the ability to talk a pilot onto a specific objective area. The standard method to talk a pilot onto an area of interest or target, without a precision targeting system available, is to identify a point on the ground that is readily identifiable to the aircraft and gradually talk the pilot onto the target area using more detailed reference points.<sup>85</sup> A more effective method is to better prepare supporting aviation units with common operational graphics. Leaders must develop a robust battlefield architecture for their assigned area of operations (AO) that is articulated using doctrinal terms, graphics, and fire control measures. This architecture must be shared with aviation assets that support the AO. Leaders must develop the ability to talk CAS and CCA pilots who do not have friendly graphics onto targets for engagement or Named Areas of Interest (NAIs) for surveillance or reconnaissance. Leaders must also be prepared to do this with coalition force pilots that may have limited mastery of the English language.<sup>86</sup>

The third skill that leaders must develop that will significantly improve the effectiveness of air-ground operations is the ability to conduct formal and informal coordination with air support assets and the ability to build constructive relationships with them. Formal, direct coordination with the aviation unit that is assigned to provide support to planned operations, that includes coordination of the ground tactical concept of the operation (CONOPS), scheme of maneuver, commander's intent, concept of fire support, and common operations graphics will significantly improve air-ground fires

responsiveness and effectiveness.<sup>87</sup> Informal coordination and the establishment of a constructive relationship with fixed and rotary wing aviation units and UAS pilots, to include sharing the battlefield architecture, CONOPS, and intelligence collection plan, will generate significant opportune air support for both ISR and attack capability.<sup>88</sup> Leaders can develop the skills of building relationships and informal coordination in training prior to deployment while simultaneously generating greater training opportunities for their units. Commanders in 4<sup>th</sup> Brigade, 10<sup>th</sup> Mountain Division (4/10 MTN) were able to significantly develop the capacity of their leaders to conduct AGI by conducting direct, informal coordination with fixed wing aviation units designated to support training at the Joint Readiness Training Center (JRTC). Aviation units were willing to use additional flight hours available beyond what was required to support JRTC to conduct repetitive Type 1 and Type 2 controls<sup>89</sup> for 4/10 MTN leaders.<sup>90</sup>

### Terminal Controller Skills

Many of the skill sets associated with leader responsibilities are also required of JTACs. However, the individual tasks required to support those skills sets for JTACs are far more focused on the detailed, technical execution of AGI. Leaders must know the technical and tactical aspects of the conduct of AGI and when it can or should be integrated. JTACs must physically make it happen.

In order to effectively conduct air-ground operations on a complex battlefield, JTACs must have detailed tactical and technical knowledge regarding the conduct of AGI. They must be able to visualize an engagement in the same manner the leader does. JTACs must fully understand the capabilities and limitations of each aircraft and its weapons and munitions payload so they can deconflict and coordinate airspace, rapidly identify the target to the aircraft, properly align the attack approach of the

aircraft, and choose the best weapon and/or munition to achieve the commander's desired effects. They must fully understand the effects of weather and terrain on the ability of a pilot to determine the location of a target and to identify it. On a complex battlefield, JTACs must be prepared to manage airspace and plan attacks for multiple aircraft variants simultaneously that may cycle throughout a single engagement. They must be prepared to do this within a tightly restricted area in order to deconflict attack aircraft with the gun target line of artillery and friendly adjacent units that may also be in contact and employing fires. They must be prepared to direct fires against enemy that are at significant elevation difference to their location.<sup>91</sup> JTACs must be able to attack mobile, elusive enemy targets in extremely small engagement areas, in close proximity to civilian population and infrastructure, without causing collateral damage or civilian casualties in accordance with established ROE.

The second skill a JTAC must possess is the ability to coordinate with a pilot to develop the best attack solution to achieve the commander's desired effects. Each aircraft will have unique weapons and munitions payload, and each situation on the ground will have unique conditions. Based on the nature of the enemy and the proximity to civilian population or infrastructure, this may require innovative attack solutions to achieve the commander's desired effects within given ROE. One example of this innovation occurred in Andar District, Afghanistan in 2011. The district was highly populated with multiple small towns separated by 1-3 kilometers. The area had a very restrictive combination of agricultural fields and irrigation wadis that provided small engagement areas. The enemy was highly mobile, traveling in pairs of motorcycles, and conducted their operations in close proximity to the civilian population. The predominant

CAS platforms that supported immediate CAS requests in Andar District were F-16 aircraft, which are not ideally suited to provide precision fires to destroy small, moving targets. The aircraft were typically armed with their internal 20mm cannon and laser guided, precision munitions. Based on the aircraft's speed and lack of agility, the aircraft were unable to effectively engage moving targets with their cannon or precision-guided munitions in the limited engagement areas. After working in close coordination with the U.S. battlespace owner's JTACs, the pilots and JTACs developed a technique in which the lead aircraft would employ its cannon to knock the insurgents off their motorcycles reducing their mobility. The second aircraft followed immediately after to destroy the insurgents with precision-guided munitions without causing collateral damage or civilian casualties.<sup>92</sup>

The final skill that JTACs must develop is the ability to talk a pilot onto a target in complex terrain.<sup>93</sup> While the use of common operations graphics is the most effective means to orient a pilot to a target, the majority of CAS employment for troops in contact results from immediate CAS requests where the pilots do not have the supported unit graphics.<sup>94</sup> JTACs must develop the ability to clearly and concisely articulate to a pilot a picture of the situation on the ground. This must include at a minimum the location of friendly units, location and description of the target, and desired effects.<sup>95</sup> JTACs must develop the ability to rapidly orient pilots to targets in complex terrain that often does not have significant distinguishing terrain features. They must be able to orient pilots to enemy elements that organize and fight in small numbers, closely resemble the civilian population, and operate in close proximity to the civilian population and infrastructure. JTACs must also be prepared to achieve these same tasks with coalition force aircraft.

## Recommendations

In order to effectively conduct air-ground combined arms operations on this complex battlefield, the U.S. military must revise its training programs, to include manning, leader training, technical training, and certification.

### Manning

The military must establish JTAC capability in Army divisions. Based on projected integrated distributed operations to inherently unstable OEs, ground units will require the ability to effectively conduct air-ground operations to protect their force and accomplish their mission. Based on the military's experience over the past eleven years, there will not be enough U.S. Air Force (USAF) qualified JTACs to fully support deployed units conducting decentralized operations.<sup>96</sup> In order to meet the expectations of the future Joint Force, the Army must have organic capability to control and authorize release of CAS munitions.

The Army should train and certify Fire Support Non-Commissioned Officers (FSNCO) at the company level to be JTACs. The Army should establish an Army Skill Identifier (ASI) for JTAC qualified personnel, and modify the MTOE to reflect the company level FSNCO as a JTAC ASI coded position. The goal should be to certify two FSNCOs in a company as JTACs for redundancy. Brigades should run consolidated assessment courses for FSNCO candidates nominated to attend a JTAC school to ensure they have the required aptitude and experience required to pass the course. While decentralized operations are consistently conducted at the platoon level on the modern battlefield, it is likely infeasible to train the number of JTACs required to assign them organic to the platoon level. It is also unlikely that a young Forward Observer (FO) in a rifle platoon would have the experience or maturity required to pass the JTAC

qualification course. Although certifying the company FSNCO as a JTAC will not fully meet the required number of JTACs to support platoon decentralized operations, combined with attached JTACs, it gives the maneuver company commander more options and flexibility to attach JTACs to platoons prioritized to high and medium risk AOs. Platoon FOs should continue to be certified as Joint Fires Observers (JFO).

Army JTACs should be certified and conduct sustainment training in accordance with the standards outlined in Joint Close Air Support Action Plan Memorandum of Agreement (JCAS AP MOA) 2004-01. This MOA has been signed by the Deputy Chief of Staff, G3/5/7 authorizing conventional Army Soldiers to be certified JTACs. Sustainment training should be conducted partnered with aligned USAF Air Support Operations Squadron (ASOS) JTACs to maintain standards of performance and build inter-service trust and legitimacy.<sup>97</sup> Army trained JTACs should be consistently integrated into company and platoon level collective training events. Training proficiency in air-ground operations at the company and platoon level should significantly improve with organic JTAC capability.

The Army Modified Table of Organization and Equipment (MTOE) should be modified at the battalion, brigade, and division level to establish capability, evaluation, and oversight of Army JTAC proficiency. The battalion FSNCO MTOE position should be modified and coded as a JTAC ASI position to establish JTAC capability at the battalion level. The brigade FSNCO MTOE position should be modified and coded as a JTAC ASI position, and the brigade FSNCO should be trained to be a JTAC evaluator in accordance with the JCAS AP MOA. The brigade FSNCO would have the responsibility for maintenance of JTAC training standards and managing JTAC certification and

sustainment within the brigade. The division FSNCO MTOE position should be modified and coded as a JTAC ASI position, and the division FSNCO should be trained to be a JTAC Instructor in accordance with the JCAS AP MOA. The division FSNCO would be responsible for oversight of the division's JTAC certification and sustainment program and JTAC training proficiency.

While many will argue that there is not sufficient capacity at accredited JTAC certification schools to support training Army Soldiers, and that there is not enough money allocated in budgets to support sustainment training for a large increase in certified JTACs, the capability to control and authorize release of munitions from joint CAS platforms is critical at the platoon and company level. Contracting retired JTAC instructors and assigning Army JTAC certified instructors will increase capacity at JTAC training schools.<sup>98</sup> Partnering Army and USAF JTACs for sustainment training will minimize impact on sustainment training costs. USAF and Army automated training management systems must be integrated to effectively link USAF squadrons that must conduct CAS training with Army units that require JTAC sustainment training. Air Force and Army Service Chiefs should publish guidance directing training integration, and establish a reporting system that tracks compliance. Finally, the Army must establish a 'tiered' system that prioritizes units and establishes the percentage of JTAC positions assigned that will be trained. Lower tiered units that are not scheduled for deployment or are not tasked for rapid deployment will have lesser percentage of JTACs trained.

### Training and Education

The Army must revise its institutional, leader, and Combat Training Center (CTC) training and education programs to develop the required attributes and skills required to effectively conduct air-ground operations in complex environments. For officers,

commissioning sources should conduct classroom education that teaches the attributes and skills required to conduct AGI as part of its Program of Instruction (POI). The POI should include a planning exercise integrating air-ground operations, and vignette training to develop decision making skills using realistic, complex scenarios that challenge the limits of the ROE and Tactical Directives.

Infantry and Armor Basic Officer Leadership Courses (BOLIC) must advance this training with the goal of graduating lieutenants to the standards of a Joint Fires Observer. BOLIC training should include planning exercises integrating air-ground operations, vignette training with realistic, complex scenarios, and a practical exercise in simulation requiring them to apply required skills. At graduation, lieutenants should understand the principles associated with AGI, be prepared for the complexity and challenges they will face on the modern battlefield, and be able to develop innovative solutions for the employment of CAS and CCA in accordance with the ROE. Field Artillery BOLIC should modify its training program to include the Joint Firepower Course curriculum with the goal to graduate all lieutenants with ASI 5U.

The Infantry and Armor Captains Career Courses (CCC) will continue to build on their officers' AGI training and experience. Each school's POI should be modified to include planning exercises, vignettes, and training in simulation that advances required skills and attributes at the company level of responsibility. The CCC training program should include the Joint Firepower Course curriculum with the goal to graduate all captains with ASI 5U. The Field Artillery CCC should conduct advanced training for its officers and make graduation with Joint Firepower Course qualification mandatory.

At the Command and General Staff College during Intermediate Level Education, all infantry, armor, and field artillery majors that do not have ASI 5U should be required to take the Joint Firepower Course elective. For NCOs, all platoon FOs should be certified as JFOs. At the Advanced Leader Course, all infantry, armor and field artillery NCOs that are not certified should receive JFO certification training.

Unit level Leader Professional Development (LPD) programs should reinforce the concepts, skills, and attributes required to conduct AGI. Vignette training should challenge leader decision making in realistic, challenging scenarios. Platoon leaders, company commanders, their fire support personnel, and aligned JTACs should conduct Situational Training Exercises (STX) in simulation centers using realistic, challenging scenarios. Those same personnel should conduct a Live Fire Support Coordination Exercise integrating indirect fire, CAS, and CCA as part of their training cycle. Infantry, Armor, and Forward Support Company NCO team leaders, squad leaders, and platoon sergeants should conduct STXs in simulation centers with unit fire support personnel developing the skills and attributes required to conduct AGI.

Unit CTC training exercises should include advanced STX and Live Fire Exercises (LFEs) that integrate multiple air fire support platforms and indirect fire support platforms in a realistic, challenging scenario. The USAF and Army should prioritize support for these training events to provide required resources and train the future Joint Force.

#### Accredited JTAC Certification Courses

JTAC certification schools effectively train the technical skills required to employ CAS/CCA in relatively straightforward scenarios. While it is unrealistic to expect JTAC certification schools to produce graduates with the skills and capabilities of JTACs with

multiple combat deployments, these schools should revise their training programs to better prepare them for modern conditions. First, the schools should implement advanced training scenarios that better represent the tactical challenges associated with the employment of CAS/CCA on a complex battlefield. Second, the training program and scenarios must develop a mindset in the JTACs that produces the ability to develop innovative solutions for the employment of CAS/CCA to accomplish their commander's intent, within established ROE, while simultaneously adhering to the proper technical requirements of employing CAS/CCA.

### Conclusion

Over the last eleven years, the U.S. military has learned and relearned many lessons in air-ground integration while conducting small unit, decentralized operations on a complex battlefield. The projected environment that the military will operate in over the next twenty years will likely be more interconnected, the threat more capable, and the conditions equally unstable. Changes must be made to our leader and Joint Terminal Attack Controller training and education programs to develop the attributes and skills necessary to meet the challenges of the future operational environment. Leader education must produce leaders who are technically and tactically competent, agile, adaptable, and tenacious, and who place trust in their subordinates in order to effectively conduct AGI and maximize the potential effects of responsive, agile assets. JTAC training must produce JTACs who are masters of their craft and able to rapidly develop innovative attack solutions in order to defeat an elusive enemy and minimize collateral damage. In order to meet the requirements of the future Joint Force, the Army must develop an organic capability to coordinate and execute air-ground operations.

The result will be an agile, flexible, rapidly deployable Army that can rapidly integrate with other joint elements and decisively execute operations on a complex battlefield.

## Endnotes

<sup>1</sup> Definition of Operational Environment: “A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander.” JP 3-0.

<sup>2</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations* (Fort Eustis, VA: U.S. Army Training and Doctrine Command G-2, August 20, 2012), 10.

<sup>3</sup> *Ibid.*, 13.

<sup>4</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>5</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020* (Washington, DC: U.S. Joint Chiefs of Staff, September 10, 2012), 3.

<sup>6</sup> U.S. Joint Chiefs of Staff, *The National Military Strategy of the United States of America 2011: Redefining America’s Military Leadership* (Washington, DC: U.S. Joint Chiefs of Staff, February 8, 2011), 4.

<sup>7</sup> U.S. Joint Chiefs of Staff, *The Joint Operating Environment 2010* (Suffolk, VA: U.S. Joint Forces Command, February 18, 2010), 66.

<sup>8</sup> U.S. Joint Chiefs of Staff, *Chairman’s Strategic Direction of the Joint Force* (Washington, DC: U.S. Joint Chiefs of Staff, February 6, 2012), 5.

<sup>9</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 3.

<sup>10</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, Training and Doctrine Command Pamphlet 525-3-0 (Fort Eustis, VA: U.S. Army Training and Doctrine Command, December 19, 2012), 6.

<sup>11</sup> U.S. Joint Chiefs of Staff, *The Joint Operating Environment 2010*, 12.

<sup>12</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 20.

<sup>13</sup> U.S. Joint Chiefs of Staff, *The Joint Operating Environment 2010*, 24.

<sup>14</sup> *Ibid.*, 29.

<sup>15</sup> *Ibid.*, 31.

<sup>16</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 22.

<sup>17</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 6.

<sup>18</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 14.

<sup>19</sup> *Ibid.*, 23.

<sup>20</sup> *Ibid.*, 14.

<sup>21</sup> *Ibid.*, 49.

<sup>22</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 2.

<sup>23</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 24.

<sup>24</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 3.

<sup>25</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 7.

<sup>26</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 17.

<sup>27</sup> *Ibid.*, 20.

<sup>28</sup> Leon E. Panetta, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense* (Washington, DC: U.S. Department of Defense, January 5, 2012), 1.

<sup>29</sup> James R. Clapper, Director of National Intelligence, *Unclassified Statement for the Record on the Worldwide Threat Assessment of the US Intelligence Community* before the Senate Select Committee on Intelligence, 112th Cong., 2nd sess., January 31, 2012, 1. Al-Qa'ida regional affiliates include al-Qa'ida in the Arabian Peninsula (AQAP), al-Qa'ida in Iraq (AQI), al-Qa'ida in the Islamic Maghreb (AQIM), and al-Shabaab in Somalia.

<sup>30</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 2.

<sup>31</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 8.

<sup>32</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 37.

<sup>33</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 8.

<sup>34</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 41.

<sup>35</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 8.

<sup>36</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 18.

<sup>37</sup> Clapper, *Unclassified Statement for the Record on the Worldwide Threat Assessment of the US Intelligence Community*, 2.

<sup>38</sup> U.S. Department of the Army, *Unified Land Operations*, Army Doctrine Reference Publication 3-0 (Washington, DC: U.S. Department of the Army, May 16, 2012), 1-3.

<sup>39</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 40.

<sup>40</sup> *Ibid.*, 35.

<sup>41</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 7.

<sup>42</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 37.

<sup>43</sup> U.S. Joint Chiefs of Staff, *The Joint Operating Environment 2010*, 68.

<sup>44</sup> *Ibid.*, 65.

<sup>45</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>46</sup> COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013.

<sup>47</sup> COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, February 7, 2013.

<sup>48</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>49</sup> U.S. Joint Chiefs of Staff, *Close Air Support*, Joint Publication 3-09.3 (Washington, DC: U.S. Joint Chiefs of Staff, July 08, 2009), V-4; COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013.

<sup>50</sup> US Federal News Service, "General Petraeus Issues Updated Tactical Directive: Emphasizes 'Disciplined Use of Force,'" August 5, 2010, <http://search.proquest.com/printviewfile?accountid=4444> (accessed January 29, 2013)

<sup>51</sup> U.S. Department of the Army, *Counterinsurgency*, Army Field Manual 3-24 (Washington, DC: U.S. Department of the Army, December 15, 2006), 1-25.

<sup>52</sup> U.S. Department of the Army, *Law of Armed Conflict Desk Book* (Charlottesville, VA: U.S. Army Judge Advocate General's Legal Center and School, 2012), 13.

<sup>53</sup> U.S. Joint Chiefs of Staff, *Joint Fire Support*, Joint Publication 3-09 (Washington, DC: U.S. Joint Chiefs of Staff, June 30, 2010), xiv.

<sup>54</sup> U.S. Joint Chiefs of Staff, *The Joint Operating Environment 2010*, 65.

<sup>55</sup> Barack H. Obama, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense* (Washington, DC: U.S. Department of Defense, January 5, 2012), Cover Letter dated January 3, 2012.

<sup>56</sup> Panetta, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense*, 4-6.

<sup>57</sup> U.S. Department of the Army, *Operational Environments to 2028: The Strategic Environment for Unified Land Operations*, 28.

<sup>58</sup> U.S. Department of the Army, *The U.S. Army Capstone Concept*, 13.

<sup>59</sup> *Ibid.*, 15.

<sup>60</sup> Panetta, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense*, 3.

<sup>61</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020* (Washington, DC: U.S. Joint Chiefs of Staff, September 10, 2012), 7.

<sup>62</sup> Obama, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense*, Cover Letter dated January 3, 2012.

<sup>63</sup> Panetta, *Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense*, Cover Letter.

<sup>64</sup> *Ibid.*, 8.

<sup>65</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 4.

<sup>66</sup> *Ibid.*, 6.

<sup>67</sup> Barrack H. Obama, "Defense Strategic Guidance Briefing from the Pentagon," January 5, 2012, <http://www.globalsecurity.org/military/library/news/2012/01/mil-120105-dod05.htm> (accessed January 14, 2013).

<sup>68</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 12.

<sup>69</sup> *Ibid.*, 7.

<sup>70</sup> *Ibid.*, 1.

<sup>71</sup> U.S. Joint Chiefs of Staff, *Chairman's Strategic Direction of the Joint Force*, 8.

<sup>72</sup> U.S. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020*, 10.

<sup>73</sup> Ibid., 15.

<sup>74</sup> ADRP 6-22, *Army Leadership*, identifies Army leader attributes as: Character (Army Values, Empathy, Warrior Ethos/Service Ethos, Discipline); Presence (Military and Professional Bearing, Fitness, Confidence, Resilience); and Intellect (Mental agility, Sound judgment, Innovation, Interpersonal tact, Expertise). ADRP 6-22 identifies Army leader competencies as: Leads (Leads others, Builds trust, Extends influence beyond the chain of command, Leads by example, Communicates); Develops (Creates a positive environment/Fosters esprit de corps, Prepares self, Develops others, Stewards the profession); Achieves (Gets results).

<sup>75</sup> ADRP 6-22, *Army Leadership*, defines Expertise in terms of Tactical, Technical, Joint, and Cultural and Geographical Knowledge. "Expertise is the special knowledge and skill developed from experience, training, and education...Leader's...tactical knowledge allows them to employ individuals, teams, and organizations effectively with the activities of systems (combat multipliers) to fight and win engagements and battles or to achieve other objectives...Technical Knowledge relates to equipment, weapons, and systems – from individual weapons to systems that give leaders technical means to execute decisive action...At higher levels, the technical knowledge requirement shifts from understanding how to operate single items to employing entire systems."

<sup>76</sup> COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013.

<sup>77</sup> U.S. Department of the Army, *Army Leadership*, Army Doctrine Reference Publication 6-22 (Washington, DC: U.S. Department of the Army, August 1, 2012), 5-1.

<sup>78</sup> *Dictionary.com*, <http://dictionary.reference.com/browse/adaptable> (accessed 23 February 2013).

<sup>79</sup> *Google Dictionary*, [http://www.google.com/webhp?sourceid=chrome-instant&ion=1&ie=UTF-8#hl=en&scient=psy-ab&q=tenacious%20%20&oq=&gs\\_l=&pbx=1&fp=206eed8da0f23a9a&ion=1&bav=on.2.or.r\\_gc.r\\_pw.r\\_qf.&bvm=bv.42768644,d.dmg&biw=1228&bih=988](http://www.google.com/webhp?sourceid=chrome-instant&ion=1&ie=UTF-8#hl=en&scient=psy-ab&q=tenacious%20%20&oq=&gs_l=&pbx=1&fp=206eed8da0f23a9a&ion=1&bav=on.2.or.r_gc.r_pw.r_qf.&bvm=bv.42768644,d.dmg&biw=1228&bih=988) (accessed 23 February 2013).

<sup>80</sup> LTC Tom Rickard, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 4<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 2, 2013.

<sup>81</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>82</sup> COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, February 7, 2013.

<sup>83</sup> COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013.

<sup>84</sup> COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, February 7, 2013.

<sup>85</sup> U.S. Joint Chiefs of Staff, *Close Air Support*, V-37.

<sup>86</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>87</sup> LTC Kenny Mintz, U.S. Army, former Commander, 1<sup>st</sup> Battalion, 32<sup>nd</sup> Infantry Regiment, 3<sup>rd</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, January 31, 2013.

<sup>88</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>89</sup> Joint Publication 3-09.3, *Close Air Support*, defines Type 1 as control “used when the JTAC must visually acquire the attacking aircraft and the target for each attack,” and Type 2 as control “used when the JTAC requires control of individual attacks and any or all of the conditions exist: JTAC is unable to visually acquire the attacking aircraft at weapons release, JTAC is unable to visually acquire the target, and/or the attacking aircraft is unable to acquire the mark/target prior to weapons release.”

<sup>90</sup> COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, February 7, 2013.

<sup>91</sup> COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013.

<sup>92</sup> This TTP was developed between the JTACs attached to the author’s battalion and the supporting aviation unit during the author’s deployment to the Andar District, Afghanistan in 2011.

<sup>93</sup> LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>94</sup> COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, Carlisle Barracks, PA, February 7, 2013; COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013; LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013; LTC Tom Rickard, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 4<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 2, 2013.

<sup>95</sup> U.S. Joint Chiefs of Staff, *Close Air Support*, V-40.

<sup>96</sup> Michael D. Millen, *Improving Detailed Integration in Close Air Support Planning and Execution*, Master of Military Art Research Project (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 2004), 22; COL Chris Ramsey, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 30<sup>th</sup> Infantry Regiment, 4<sup>th</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), interview by author, February 7, 2013; COL J.B. Vowell, U.S. Army, former Commander, 2<sup>nd</sup> Battalion, 327<sup>th</sup> Infantry Regiment, 1<sup>st</sup> Brigade, 101<sup>st</sup> Infantry Division (Air Assault), telephone interview by author, January 29, 2013; LTC John Paganini, U.S. Army, former Commander, 1<sup>st</sup> Squadron, 71<sup>st</sup> Cavalry Regiment, 1<sup>st</sup> Brigade, 10<sup>th</sup> Infantry Division (Mountain), telephone interview by author, February 4, 2013.

<sup>97</sup> SFC David Mahnken, U.S. Army, JTAC Instructor, 5<sup>th</sup> Special Forces Group, telephone interview by author, January 25, 2013.

<sup>98</sup> SFC David Mahnken, U.S. Army, JTAC Instructor, 5<sup>th</sup> Special Forces Group, telephone interview by author, January 25, 2013.