ARMED FORCES JOURNAL
A TEGNA Company

Features

October 1, 2011

Getting there is half the battle

How to fix ground force mobility

Strategic, operational and tactical mobility for U.S. ground forces presents problems more fundamental than any anti-access and area denial efforts by our adversaries.

The dramatic reduction in the number of overseas U.S. bases means that by 2013, more than 90 percent of the Army will be based in the continental U.S. Future operations will therefore likely require power projection into areas where the U.S. has no bases and in countries that lack modern infrastructure.

Geography still makes it difficult and time-consuming to deploy U.S. forces to distant, austere locations such as Iraq and Afghanistan. Major ground force deployment requires deep-draft ports, high-capacity airfields and well-maintained road and rail networks. This sort of infrastructure is not the norm in many potential conflict areas. When we do arrive in these locations, it's often just as difficult to move into place for tactical operations.

As the Army prepares to make critical decisions about modernization efforts such as the Ground Combat Vehicle, the Joint Light Tactical Vehicle and revisions to the Army family of concepts, senior leaders must understand the factors and metrics associated with mobility.

In 2008, the Army Capabilities Integration Center (ARCIC), in partnership with the Sustainment Center of Excellence Deployment Process Modernization Office (DPMO), began the Global Deployment Assessment, a comprehensive effort to determine our ability to move forces to and within potential hot spots. The work looked specifically at the so-called Arc of Instability, a global swath of territory that sees frequent armed conflict and includes failed or failing states.

In 2009, we expanded this work, adding a Ground Mobility Assessment to look at the on- and off-road mobility of various ground vehicles.

These assessments' initial findings suggest several ways to improve and think about mobility.

STRATEGIC AIRLIFT

Large cargo aircraft offer rapid deployment capability but limited cargo capacity. The deployment of brigade-size or larger ground units requires a high number of sorties and is expensive to execute. And simple airfield availability is problematic in many countries.

Take Nigeria, a country about one-third larger than Texas. While Texans fly from more than 400 airfields, Nigeria has but 62. The Air Force has surveyed only 16, and found just four suitable for C-5 transport aircraft. Another 19 might be suitable for inter- or intra-theater airlift.

From a practical standpoint, strategic deployment requires improved fixed runways plus sufficient infrastructure to park, refuel and maintain large aircraft. The C-5, our largest military aircraft, cannot land on unimproved airstrips or on runways shorter than 6,000 feet, and its low mission-capable rate of 54 percent limits deployment to major airfields where it can be parked and repaired. The smaller C-17 can operate from unpaved runways, but the ruts that form must be repaired to reduce the risk of damage to the aircraft.

But runway size and condition is not the only limiting factor for an airport; another is the number of aircraft that can be on the ground at any one time. Of the countries

studied, only seven had four or more airfields that could accommodate more than two aircraft on the ground, and they tended to be in urban areas, lessening their military usefulness. Most of the lesser airfields could handle just two aircraft.

Deployment times could be shortened by reducing a brigade's total weight. In deployments to airfields with a maximum-on-ground (MOG) capacity of two aircraft, every 1,000 short tons cut shortens deployment time by one day.

But ultimately, such calculations show, the Army's current strategic deployment goals are simply unachievable.

The 2011 Army Campaign Plan says it should take four to seven days to insert a modular brigade anywhere in the world. But the only unit that can be expected to meet this goal is an airborne brigade. Using a realistic allocation of aircraft, the study showed that deploying to a MOG-2 airfield requires a minimum of 10 days for a light infantry brigade and an average of 29 days for a brigade of any type.

Strategic deployment by air, although the fastest means available, does not meet current deployment goals, nor is there any reasonable expectation that it will in the future.

STRATEGIC SEALIFT

Large cargo vessels offer very large capacity for heavy equipment and lower ton-mile costs, but deployment speed is slower than by air.

The DPMO assessment found that it takes at least nine days to deploy a light battalion by strategic sealift, at least 17 days to deploy a light brigade combat team, and an average of 37 days to deploy a brigade combat team of all types.

Moreover, our current cargo ship fleet ties us to major ports of certain sizes and capabilities: The ships require large piers, deep drafts and shore-side assistance. Lesser ports cannot adequately replace a major port.

In 2006, the Surface Deployment and Distribution Command Transportation Engineering Agency looked at 2,077 ports worldwide. Only 12 percent met the criteria for "Strategic Upper" — those that are able to receive ocean-going vessels with global range without refueling at full payload, can provide 750 feet or more berthing space, have 30 feet or more draft at berth and have shore-side assistance available for berthing and unloading. This port category is required for large, medium-speed, roll-on/roll-off, or LMSR, vessels, the prime movers of U.S. military equipment during the

conflicts in Iraq and Afghanistan.

An additional 20 percent of those ports fall in the "Strategic Lower" category, which can handle ocean-going vessels with global range without refueling at full payload, provide 650 feet or more of berthing space, have 25 feet or more draft at berth and have some shore-side assistance available for berthing and unloading. This port category is required for Cape D-class cargo vessels.

on the ground

Good ports and major airfields often come with a significant disadvantage: They are located in or near large cities, where congestion hinders forces' movement out to the places they need to be.

Tactical ground mobility away from ports and airfields is key to planning an operation. The DPMO assessed 11 million square kilometers of surface area and found that only 20 percent was within 50 kilometers of an airfield that could handle C-17s and C-130s.

Terrain affects the location of landing sites, the selection of objectives, routes of advance and sustainment of supported units. Poor roads, typical in many developing countries, and rough terrain make on- and off-road mobility difficult.

We need to better understand these challenges to inform our decisions about vehicle acquisition and maneuver concepts.

So the Army Capabilities Integration Center, in conjunction with the National Geospatial-Intelligence Agency, the Army Geospatial Center, the Engineer Research and Development Center and the Army Materiel Systems Analysis Activity, is analyzing the mobility characteristics of various wheeled and tracked vehicles in operational environments worldwide.

This analysis includes elevation data and other terrain characteristics, such as surface roughness, soil moisture, vegetation and obstacles. For areas where adequate terrain data exists, we will conduct geo-specific analyses. For other areas, we will conduct geo-typical analyses using surrogate terrain.

Early results reveal that lighter vehicles with high horsepower-to-weight ratios are faster on dry normal terrain and tend to be faster in mountains than heavier wheeled vehicles, especially some mine-resistant, ambush-protected (MRAP) variants. Tracked vehicles have off-road mobility advantages and lower no-go percentages as slope and surface roughness increase; both the M1 Abrams tank and the M2 Bradley infantry

fighting vehicle perform well in this type environment. But the Abrams and the Bradley, along with the armored vehicle launched bridge and other vehicles wider than 134 inches, will be about 40 percent to 50 percent less mobile in urban areas.

RECOMMENDATIONS

The rapid projection of military power is a critical aspect of U.S. influence abroad. It underpins the nation's ability to intervene whenever and wherever the president deems necessary in support of our national security objectives. Limits on our ability to conduct rapid strategic movement decrease our response capability and degrade national power. Yet the trend toward heavier tactical such as the MRAP family of vehicles and the development of a Ground Combat Vehicle means that deployment times, especially via strategic airlift, are likely to become longer, not shorter.

Simply adding large cargo aircraft or ships will not fix the strategic deployment problem, whose primary limiting factor is the lack of foreign infrastructure. Foreign port and airfield infrastructure within the arc of instability is unlikely to improve dramatically. Increasing urbanization will make ground movement away from major ports and airfields more difficult.

Therefore, we offer several recommendations:

• Continue to develop a Joint Future Theater Lift aircraft that can take off and land vertically or on short fields. Conceptual vertical takeoff and landing (VTOL) aircraft can increase intratheater throughput between 22 percent and 50 percent. Using Boeing's Opportune Landing Site (OLS) software tool, we identified 11 million potential short takeoff and landing (STOL) sites (1,500-foot) in the study countries and more than 56 million potential VTOL sites. In Afghanistan alone, the OLS software identified 251,000 potential STOL sites and 1.4 million potential VTOL sites.

• Develop the Joint High Speed Ship. A conceptual shallow-draft vessel that can offload in austere port facilities can reduce strategic sealift time by 32 percent, with minimal reception, staging, onward movement and integration required.

• Acquire more digital terrain data. Ground mobility analysis is vital because of the lack of airfields near potential operational areas, the general inadequacy of roads in the developing world and the impact of terrain on cross-country movement.

• Establish more realistic Army deployment goals. As the DPMO study found, the current goals are not achievable. Worse, they are extremely misleading and do not help

our national leaders understand how long the deployment of a tactically significant ground force will actually take. The ARCIC is working with the Army Staff on developing new deployment goals.

• Conduct more studies and experimentation to determine how large a force is required to execute a joint forcible entry operation in likely scenarios and how deployment time varies with force size. Experimentation and war gaming involving realistic adversaries depicted in challenging scenarios can help shed light on the acceptable level of risk incurred by deployment time. For example, is an airborne force with significant aerial resupply, followed by a brigade combat team three or four weeks later, an acceptable risk for various potential operational scenarios? We are studying forcible entry requirements for an airborne force in both permissive and nonpermissive environments. These requirements will be confirmed with experimentation.

• Study the effect of a float Army prepositioned stocks on deployment times. Prepositioned stocks have been used extensively in operations in Southwest Asia and will not be fully reconstituted until 2015. Future studies should look at their potential for reducing deployment time for early-arriving forces.

• Examine the possibilities of combining the expeditionary capabilities of the Marine Corps and the Army, seeking synergies.