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ABSTRACT: This article examines the matériel challenges the US Army might encounter if it were required to expand to twice its size on short notice.

For the US Army to expand rapidly, its leaders will have to make critical decisions on organizational and matériel requirements. However, a recent research effort at the US Army War College reveals that some equipment, such as air defense artillery and aviation assets, will be difficult to procure quickly.[1] This challenge is due to the manufacturing requirements of American and allied industries, and it is significant enough to require the Army to reexamine some of its expectations about rapid expansion. For instance, 10 years would be needed to produce theater ballistic defense equipment and ammunition, eight years for aviation assets such as attack helicopters, and three years for armored units such as the M2 Bradley fighting vehicles and armored breaching vehicles.

Admittedly, the Army could use prepositioned stocks to overcome some of its matériel challenges. Likewise, older equipment from the depots could be issued, newer equipment from commercial markets could be purchased, or the Army could adjust the quantities it requires. But, these solutions will not provide the Army with everything it needs; nor would they provide it with the most capable equipment for fighting another great power.

Analytical Framework and Findings

The benchmark for this study was doubling the Army within a 36-month time frame. While any number of scenarios would not require that level of effort, many would. Regardless, the benchmark helped identify a number of stress points within the matériel production system that the Army should address. In addition, the following assumptions were made. First, financial aspects of production are relaxed. Second, acquisitions and contracting allow for open competition and sole-source contracting. Third, maintenance and sustainment are initially conducted by contractors and later transitioned to Army personnel. Fourth, space for facilities or training is sufficient. Fifth, American acquisitions are prioritized by the State Department, which would include stopping production for foreign military sales and delaying new agreements during expansion. Sixth, equipment from Army prepositioned stock is

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1 This study was carried out by an integrated team of faculty and students who examined the US Army's ability to expand quickly to fight a great-power war.

harvested as soon as possible and refilled later. Lastly, outdated equipment solutions are accepted by the Army until new matériel becomes available.

The study's principal finding was that American industry would struggle to build and to field enough theater ballistic defense, aviation, mechanized infantry, and other matériel to meet the benchmark described above. Therefore, to acquire the raw materials needed to produce Army equipment during an expansion effort, the Department of Defense should develop and publish a plan similar to the Industrial Mobilization Plan of 1939.[2] The pre-World War II mobilization plan that synchronized production schedules of different equipment, for example, was published by the Army in early 1938, nearly four years before Pearl Harbor, updated the next year, and modified throughout the war.[3]

Under the guidance of President Franklin D. Roosevelt the government redirected some factory output prior to World War II. In addition, lend-lease agreements enabled the United States to support Allied efforts to thwart Axis powers while preparing for the nation's possible involvement.[4] In 1942, the War Production Board was established to take control of and manage the requirements process. By 1944, the Victory Program had produced 185,000 planes and 120,000 tanks.[5] Despite a slow start, the proactive measures that national leaders began in 1939 laid the groundwork for industry structure and for raw materials to be postured correctly before war was declared in December 1941. In sum, the nation took three years to produce the equipment the Army needed for combat operations in a two-front war. Without Roosevelt's foresight, an additional two years, or more, might have been needed to produce the same amount of equipment.

Notably, today's Army already has lethal units with mostly modernized equipment and a robust funding and acquisition system. Unfortunately, the manufacturing base for large equipment is small, and the competition with foreign companies is great. Today's systems and the tools to produce them are more complex, which requires more time and skill than has been needed previously.

The Army is also challenged by an industry preference for funding new technology but then producing only enough for deployable units to use. In practice, this approach creates a small number of well-equipped units and a large number of ill-equipped units. From the industry point of view, producing a small amount of equipment for ten years is preferable to producing a large amount of equipment for three years.[6] Thus, to fight a major war, the Army's leadership must communicate a sense of urgency to industry leaders about how much and how soon the equipment is needed.

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2 Marvin A. Kreidberg and Merton G. Henry, *History of Military Mobilization in the United States Army, 1775–1945* (Washington DC: Department of the Army, 1955), 479–80.

3 1938 Protective Mobilization Plan; 1939 Protective Mobilization Plan; and Kreidberg and Henry, *Military Mobilization*, 479–82.

4 US Office of the Historian, "Lend-Lease and Military Aid to the Allies in the Early Years of World War II," US Department of State, October 12, 2017, https://history.state.gov/milestones/1937-1945/lend-lease.

5 Mobilization, 16–18.

6 Interview with resourcing division chief, January 25, 2017. For operational security purposes, names and other interview details have been removed.

The new plan that the Defense Department develops, therefore, should articulate the intent to mine or to purchase raw materials such as aluminum, copper, steel, tungsten, and other rare-earth materials.[7] Since the United States is the world's fourth largest producer of copper and steel as well as the sixth largest producer of aluminum, acquiring these resources should be manageable. Although the United States does not mine or produce tungsten, it could likely purchase that material from Canada, the world's third largest producer.[8]

China produces most rare-earth materials. Thus, purchasing those materials could be problematic during future conflicts. Other nations are attempting to produce more of these materials, but progress is slow. The Defense Logistics Agency manages stockpiles and contracts for strategic minerals distributed to industry. Public law also allows defense requirements a higher precedence than commercial needs.[9] The Department of Defense only monitors rare-earth materials, however, and has no plan to direct the acquisition of raw materials, internally or from foreign nations, nor to coordinate material distribution to American industry.[10]

Albeit with some equipment shortages, the full support of the government, and unlimited funding, the Army would be able to build quickly Stryker and light BCTs, field artillery, engineer, transportation, and other support units. However, as further analysis demonstrates, numerous challenges exist that prevent theater ballistic air defense units, combat aviation brigades, and armored BCTs from being doubled as quickly as other units.

Air Defense Units

Industry could not double the quantity of missile units within three years. To expand from 15 to 30 Patriot battalions, the Army would need 360 more MIM-104 launchers.[11] Current production for this weapon is designated for foreign military sales, and the M903 launching station upgrades, scheduled through 2024, do not include producing new units. Due to the manufacturing time for subcomponents, one battalion could be fielded within five years.[12] A 30-month start-up would be required to add facility space and vendors.[13] Even after prioritizing US needs over foreign military sales, the program manager would need a minimum of ten years to equip 15 more Patriot battalions.[14]

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7 Interview with deputy maneuver division chief, December 6, 2016; interview with mission command system synchronization officer, January 26, 2017; and email message to author, March 29, 2017.

8 Amber Pariona, "Top Copper Producing Countries in the World," World Atlas, April 25, 2017, http://www.worldatlas.com/articles/top-copper-producing-countries-in-the-world.html; Benjamin Elisha Sawe, "Top 10 Steel Producing Countries in the World," World Atlas, April 25, 2017, http://www.worldatlas.com/articles/the-top-10-steel-producing-countries-in-the-world.html; E. Lee Bray, "Aluminum," in US Department of the Interior, *Mineral Commodity Summaries, January 2015*, (Reston, VA: US Geological Survey, 2015); and "Tungsten: World Concentrate Production, By Country," IndexMundi, March 30, 2017, http://www.indexmundi.com/en/commodities/minerals/tungsten/tungsten_t15.html.

9 Email message to the author, March 29, 2017.

10 Ronald W. Murawski, *Strategic Materials Protection Board Meeting Pre-Brief* (Washington DC: Army, Acquisitions, Logistics, and Technology [ASA (ALT)], February 10, 2014), briefing slides.

11 Interview with Patriot system synchronization officer, December 6, 2016.

12 Interview with Patriot deputy system synchronization officer, March 7, 2017.

13 Interview with Patriot deputy system synchronization officer, March 29, 2017.

14 Interview with Patriot system synchronization officer, December 6, 2016.

Patriot missiles would be even more difficult to double. To obtain the 3,000 additional missiles, the Army would immediately have to start stockpiling the missiles required to prosecute any anticipated major war immediately. The vendor would need 18 months to produce the first 10 missiles before being able to sustain production of 10 missiles per month, with a surge capability of 30 missiles per month for one year.[15] At this rate, the vendor would need about ten years to meet the required expansion quantity of Patriots. The Army could hire another vendor, but development and testing of the new missile would require about five years.[16] If the testing was successful, the secondary vendor could decrease the missile time line to eight years.

An Army plan to double terminal high altitude area defense (THAAD) missile batteries from 8 to 16 would also fall critically short within three years. Equipment production for these batteries is scheduled to end near the end of 2018. If a pending foreign military sale reopens the production line, the Army's purchase of this equipment will be more affordable. Once reopened, the first battery would take three years to produce. Sustained manufacturing would then produce one to two batteries per year.[17] At this rate, the Army would have 16 batteries in about seven years.

Ammunition production is more difficult. The combat load of a THAAD battery is 48 missiles. At current rates of production, the Army plans to acquire 60 percent of the missiles required for seven batteries by 2017.[18] Fourteen batteries could therefore be fielded, trained, and deployed by the end of 2021. Obviously, this goal could be met more quickly with additional vendors developing and producing other munitions with the same capabilities.

Given the increased demand for short-range air defense capability during 2017, the Army is reassessing how much additional capacity is required.[19] As a planning factor, the Force Management Directorate supports one such battalion per division, a growth from 9 to 36 battalions.[20] These units could be built with new technology, under the best of circumstances, within four years. The Army also plans to place the FIM 92 Stinger short-range, man-portable, air-defense weapon system in BCTs by the end of 2017 for the first time since 2004 and add Avengers to Army prepositioned stock.

Combat Aviation Brigades

American industry would be challenged to build the aircraft necessary to double the existing 21 combat aviation brigades. These combat units require 137 aircraft each, a total of more than 2,800 aircraft. Additional aircraft would be needed for the generating force training at Fort Rucker, Alabama. The organizational plan increases the attack capability by adding Apaches, while decreasing the assault

15 Interview with Patriot system synchronization officer, December 7, 2016.

16 Interview with Patriot system synchronization officer, March 20, 2017.

17 Interview with THAAD system synchronization officer, January 27, 2017.

18 Interview with THAAD system synchronization officer, December 6, 2016.

19 Interview with Joint theater air and missile defense system synchronization officer, March 8, 2017.

20 Interview with deputy division chief, December 6, 2016.

and medical evacuation capability by subtracting UH-60 Black Hawk helicopters, consistent with the vision from Army leadership.[21]

> My number one need is for combat aviation. . . .the biggest gap in our capabilities. . . . Everybody knows that the Army is designed to fight with our aviation. So, the Army is trying to figure out a way to do it whether it is rotational aviation, [or] rotational troops. . . . Combat aviation is critical.[22]

Building Army aviation is extremely time consuming. For each airframe, the vendor needs 12 to 18 months to reach maximum production capacity, to corner the market, and to procure steel and titanium. Even more challenging is the need to hire and train skilled laborers to manufacture the complex gearboxes, engines, and drivetrain components. Opening additional production lines would not help in the short term, and building a new facility or retooling an existing facility would take at least 24 to 36 months. New locations would gradually reach maximum production capacity in four years under the best circumstances.[23]

The Army currently has 734 Apache attack helicopter airframes for an expansion requirement of 42 combat action brigades and for the training base at Fort Rucker. The airframes would take a minimum of nine years to produce at a rate of 110 aircraft per year with a start-up requirement of three years.[24] Maximum capacity would occur during the fifth year, and the rate cannot be increased due to the physical constraints of the production line. The limitations associated with subcomponent suppliers, such as the alloys for the compound blade and the time required to test tolerances and specifications, could be accelerated with unlimited funding, but not significantly.[25] At this rate, 672 aircraft could be produced in eight years. With two additional facilities, production could reach maximum capacity in five years, 330 aircraft could be produced during the seventh year, and the required aircraft would be available in nine years.[26]

The quantity of Black Hawk assault helicopters would be extremely difficult to double within three years, but could be achieved in six. The Army currently has enough Black Hawks for every expeditionary combat aviation brigade capable of assault and for those capable of attack and assault. To increase to 42 combat action brigades and meet the increased training requirements, the Army will require an additional 700 aircraft.[27]

The current production pace of UH-60Ms to replace the existing Black Hawk models should be sustainable through 2028.[28] The 30-year life cycle of the older UH-60As cannot be extended since the deteriorating airframes are unsafe. The facility could build enough Black Hawks in 36 months to equip four combat aviation brigades. With unlimited

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21 Steven Powell, *Leader Book, Army 2023* (Washington, DC: HQDA G-3/5/7, December 6, 2016), briefing slides, 50–51.

22 Jen Judson, "Lt. Gen. Ben Hodges: US Army Europe and Its Role in Deterrence," Defense News, March 7, 2016.

23 Interview with ASA (ALT) staff, February 16, 2017.

24 Interview with attack aviation system synchronization officer, December 7, 2016.

25 Interview with aviation systems coordinator, March 29, 2017.

26 Interview with ASA (ALT) staff, March 10, 2017.

27 Powell, 50–51.

28 Interview with assault aviation system synchronization officer, December 7, 2016.

funding, two more facilities could be built to reach the required aircraft goal during the sixth year.[29]

The quantity of CH-47 Chinook heavy-lift cargo helicopters for 42 combat action brigades plus the aircraft needed for training requirements could be met within five years. The Army currently has two production lines capable of producing 200 aircraft in just over four years.[30]

Unmanned aerial systems, such as Gray Eagle and Shadow, provide commanders with battlefield reconnaissance. But, building enough for 42 combat aviation brigades cannot be done within three years. The program manager for Gray Eagles is still fielding the system to the Army. If required today, the vendor would need eight years to reach the additional 300 systems required for expansion. If prioritized, the Army could receive expansion quantity for Gray Eagle within six years.[31] Similarly, the Army would not have enough Shadow systems within three years. The Shadow project fielded 416 systems to the Army before production stopped in 2010. An Army expansion already underway would increase the required number of Shadows to nearly 1,000 systems. Assuming a 24 month start-up, the vendor could produce enough Shadows within five years.[32]

Armored Brigade Combat Teams

Due to the variety of armored vehicles, armored BCTs are the third most difficult matériel requirement to address for an expansion. Fortunately, the Army has 15 manned and 5 unmanned sets of equipment available. Nine manned armored BCTs are in the active component; five are in the Army National Guard and one rotational set is in Korea. The Army possesses enough equipment for three armored BCTs in Army prepositioned stocks. Other sets of equipment are under production. Thus, to expand from 15 to 30 armored BCTs, 10 additional sets of equipment will be needed.[33] Alternatively, the Army could issue less up-to-date equipment from depots.

Army Matériel Command owns older equipment that could be refurbished and fielded faster than new equipment could be produced. Most of the excess equipment stored at the depots would support maneuver and fires brigades as well as combat service support units. Such equipment could support two armored BCTs of Bradley infantry fighting vehicles and M113 armored personnel carriers; three battalions each of M270 multiple launch rocket systems, M142 high mobility artillery rocket systems, and M119 105mm howitzers; six battalions of Avenger missile systems; and most of the medium- and heavy-cargo and fuel trucks to support those organizations.[34] Depending on the personnel and training time lines, the older equipment could expand the training base or undergo modernization. Moreover, if such equipment is fielded to the first expansion units, it could be replaced at a later date.

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29 Interview with ASA (ALT) staff, February 16, 2017, and March 10, 2017.

30 Interview with heavy lift system synchronization officer, January 11, 2017; and interview with ASA (ALT) staff, February 16, 2017.

31 Interview with unmanned aerial systems coordinator, March 7, 2017.

32 Ibid.

33 Interview with force development staff, December 7, 2016, and January 10, 2017.

34 Interview with Army Matériel Command liaison, March 29, 2017.

The most critical pieces of equipment for armored BCTs are Bradleys and M1 Abrams tanks. Other necessary armored vehicles include the M109 Paladin Integrated Management (PIM) 155 mm self-propelled howitzer, the M88 Hercules recovery vehicle, and the M1 assault breacher vehicle. The BCTs will also have the new armored multi-purpose vehicles, which replace the aged M113 armored personnel carrier and share the same chassis as the Bradley. Therefore, expanding the Army by 10 armored BCTs will require building 870 tanks and 2,670 Bradley chassis.[35]

The shared chassis poses a challenge. Raw materials for aluminum plate armor and other key components as well as available facility space constrain production to no more than 2 armored BCTs per year with an 18-month lead time. If additional facilities are used, enough chassis could be produced within six years.[36] Alternately, the Bradleys could be built and fielded before transitioning production to the armored multi-purpose vehicles. In both scenarios, the Army must coordinate aluminum procurement with the Defense Logistics Agency. Under these conditions, the Army could achieve expansion requirements within 48 months.

The Army can successfully double its tank battalions by modernizing current inventory. Nearly 2,000 M1A1 Abrams tank hulls can be refurbished before engines, transmissions, and turrets are added. After 12–18 months, this pipeline can produce enough tanks per month, to enable the Army to meet tank requirements within 30–36 months.

The upgraded Paladins would require four years to expand from 15 to 30 battalions in the active component and from 10 to 20 battalions in Guard echelons above the brigade level. Current production of the modernized howitzer systems can be expanded to meet requirements[37]

The desired quantity of Hercules systems can be obtained within 24 months by refurbishing current inventory.[38] Notably, by ceasing conversions of A1s to A2s, space can be freed to accommodate the increased demand for the other armored vehicles.[39] Expanding armored breaching vehicles would take seven years, even though the current rate of production will field enough vehicles for each armored BCT by 2022.[40]

Stryker Brigade Combat Teams

Stryker platform production could, with new facilities, be expanded to equip the force with sufficient vehicles in four years. This rate of production is enough to fill five of the nine expansion Stryker BCTs within the 36-month goal. Although expanding Stryker facilities could increase the rate of production, which would require a 24-month start-up time just to complement Stryker vehicle production, the expansion goal would still take 48 months to achieve.[41]

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35 Interview with deputy maneuver division chief, December 6, 2016.

36 Interview with Program Executive Office Special Project staff, January 26, 2016.

37 Interview with cannon system synchronization officer, December 6, 2016, and March 7, 2017.

38 Interview with integration action officer, February 28, 2017; and interviews with cannon system synchronization officer, December 7, 2016, and February 28, 2017.

39 Interview with Special Project Office staff, February 28, 2017.

40 Interview with Mobility Branch chief, March 7, 2017.

41 Interview with action officer, February 28, 2017.

Field Artillery Units

As part of the field artillery expansion, the M270 multiple launch rocket system (MLRS), the most lethal field artillery system, would increase sufficiently in three years with no new production.[42] Army Matériel Command has three available battalions of equipment, so the expansion requirement would be five battalions. The production line for this equipment was closed in 2005, but older versions of the module can be modernized.[43] The Army can procure the lighter high mobility rocket system (HIMARS) within four years. HIMARS battalions would expand from 17 to 34 and require 272 more systems. Using one battalion's worth of unmanned systems in prepositioned stock and several owned by Army Matériel Command, the vendor can produce and field enough of these rocket systems in the next four years to fill the expansion requirements.

The cannon expansion of M777 155mm howitzers and M119s will take three years.[44] The quantity of M777s would grow from 7 to 14 battalions in echelons above the division level and increase by 32 batteries within the Stryker and infantry BCTs. Production of these weapons, at a rate of 16 per month, ended in 2011; new production of M777s requires a two-year start-up.[45] M119s would expand from 64 to 128 batteries within infantry BCTs, but some of the 105mm howitzers are in prepositioned stock and Army Matériel Command owns more of these weapons as part of a conversion project. Assuming an 18-month start-up, M119s could reach the expansion target.[46]

The Army's new field artillery radar, the AN/TPQ-53 Quick Reaction Capable Radar, will take four years to field. The vendor is currently distributing 2 Q53 radars per BCT to replace the older Q36 and Q37 radar systems. Increasing by 172 more radar systems would take a total of seven years. The Army could mitigate the shortage of counterfire systems by retaining some of the older systems. With no funding constraints, the manufacturer could also more than double the production rate within 18 months of a decision to expand.[47] The AN/TPQ-50 lightweight counter mortar radar could increase by the required 314 systems in five years.[48] The Army could decrease this time line if it reduced the number of systems for each BCT from 4 to 2. With unlimited funding, the vendor could also increase production to 16 systems per month.[49]

Engineer Units

Requirements for bridging equipment, which the Army is currently short of, and earth moving equipment could be met respectively within five and two years. Unlimited funding could increase Joint Assault Bridge output to meet the fielding schedule to armored units by 2022 and restart production of the Rapidly Emplaced Bridging System production to field two bridging assets for the expanded maneuver brigades within five

42 Interview with rocket system synchronization officer, December 6, 2016, and March 6, 2017.
43 Interview with rocket systems synchronization officer, January 26, 2017.
44 Interview with rocket systems synchronization officer, December 6, 2016, and January 25, 2017.
45 Interview with rocket systems synchronization officer, January 25, 2017.
46 Interview with rocket systems synchronization officer, December 6, 2016.
47 Interview with product manager, January 26, 2017.
48 Interview with radar system synchronization officer, December 6, 2016.
49 Interview with product manager, January 26, 2017

years.[50] The Army can purchase earth moving equipment quickly from commercial vendors, who can produce enough bulldozers, excavators, and other horizontal construction equipment requirements within two years.[51] Additionally, increasing route clearance platoons to protect maneuver forces could be completed within four years. After depleting equipment in Army prepositioned stocks, new vendors, with an 18–24 month start-up, could deliver the required quantities of Buffaloes, Huskys, and Medium Mine Protected Vehicles.[52]

Supporting Equipment

Communications Equipment. The challenge of communications equipment—such as radios, mission command systems, and the Joint Battle Command Platform—occurs not from production, which should be complete within 36 months, but integrated fielding of this equipment with the platforms described above. In fact, given enough funding, industry would be able to produce radios faster than the Army could train Soldiers.[53] Expanding units while maintaining similar communications equipment and modernization levels, however, would be a struggle. This aspect would force prioritized fielding to deploying units, causing combatant commanders to lower communications standards, as well as focus expansion on maintaining minimal compatibility without latency throughout the force. As mission command systems are computer based, the required technologies, such as laptops and software, are easily procurable in expansion quantities.[54]

Although the vehicle mounting hardware for the Joint Battle Command-Platform requires extensive time to install on combat vehicles and aircraft, expansion could follow the Blue Force Tracking model—the Army would synchronize procurement with unit deployment. Requirements might be adjusted by limiting systems to key unit leaders such as platoon leaders. In this scenario, no two deploying units would look alike or have the same density. Moreover, 2017 plan revisions decrease quantity of platforms by 25,000 to improve fielding velocity and decrease training time by 24 hours to allow reserve units to train soldiers during one weekend drill.[55] The Army would try to maintain modernization levels within deployment windows to avoid interoperability challenges. Modernization is anticipated to take eight years for the existing BCTs, but the Army could decrease this schedule to three years by synchronizing unit availability with resources.[56]

Transportation Equipment. The final large, high-density equipment for the Army are trucks and trailers. Light (80,000), medium (50,000), and heavy (10,000) trucks, with cargo and fuel capability would take about five years to complete with a production rate of 20,000 trucks per year after an 18-month start-up period.[57] This time line could be shortened by allowing more commercial trucks, similar to Mine Resistant Ambush

50 Interview with Mobility Branch chief, March 7, 2017.
51 Interview with mobility support system synchronization officer, March 7, 2017.
52 Interview with protection system synchronization officer, January 25, 2017.
53 Interview with radio system synchronization officer, March 8, 2017.
54 Interview with mission command system synchronization officer, January 26, 2017.
55 Interview with mission command system synchronization officer, March 8, 2017.
56 Interview with mission command system synchronization officer, January 26, 2017.
57 Interview with Transportation Branch chief, March 20, 2017.

Protected vehicles, or changing American industry to a wartime posture such as World War II. Either of these options would decrease the production schedule to three years.

Conclusion

For the Army to respond quickly to a great-power threat, leaders must complete the critical tasks of approving the organizational and matériel plans far in advance. World War II experience clearly demonstrates the benefits of early plans to expand the Army and its required equipment. American industry produced vast amounts of equipment in the 30 months between Pearl Harbor and the amphibious assault at Normandy. A detailed organizational plan for expanding deployable units would influence a detailed matériel plan that could be used to coordinate with American industry.

Such a collaborative effort will provide vendors with time to develop their own plans for equipment production as well as allow the Army to identify the raw materials, space, manpower, and energy needed for mass production. Synchronization with other organizational plans such as personnel, training, facilities, sustainment, and ammunition not discussed here could also occur. Estimates and plans for organization and matériel should then be updated based upon the evolving adversarial threats, industry capabilities, and other influences, even during expansion.

Assuming unlimited funding and some optimistic circumstances, equipment projections for tanks, howitzers, and other major equipment are favorable; however, shortages in theater ballistic defense, aviation, and armored units are anticipated. Steps to mitigate these deficiencies include adding vendors who can develop and produce other versions of theater ballistic defense weapons and attack aviation aircraft, leveraging Army prepositioned stock, incorporating older equipment on-hand, and purchasing new commercial equipment. In order to mitigate major transportation equipment shortages, Army leadership could change the organizational plan by decreasing units or equipment quantities as well as deploy units into battle with shortages.