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December 8, 2010

The Honorable Adam Smith
Chairman
The Honorable Roscoe Bartlett
Ranking Member
Subcommittee on Air and Land Forces
Committee on Armed Services
House of Representatives

Subject: *Defense Transportation: Additional Information Is Needed for DOD's Mobility Capabilities and Requirements Study 2016 to Fully Address All of Its Study Objectives*

The National Military Strategy of the United States calls upon the Armed Forces to retain the ability to rapidly deploy and sustain capabilities to diverse regions, and the Quadrennial Defense Review 2010 acknowledges the fundamental importance of U.S. capability to project power. The National Security Strategy identifies taking stock of capabilities as one of many ways of reducing military risk. To identify the mobility tools needed for force projection, the Department of Defense (DOD) has conducted several studies, including the fifth and most recent—the Mobility Capabilities and Requirements Study 2016 (MCRS-16).¹ DOD issued the report in February 2010.

The intent of the MCRS-16 was to provide senior leaders with a detailed understanding of the range of mobility capabilities needed for possible future strategic environments and help them make investment decisions regarding mobility systems. Specifically, the study was to examine, among other things, how changes in the mobility system affect the outcomes of major operations and to assess the associated risks. The MCRS-16 determined that with few exceptions, the projected mobility capabilities in 2016 are sufficient to support the most demanding projected requirements. The MCRS-16 reported on specific mobility issues, including the following ten mobility systems addressed in the unclassified executive summary and depicted in figures 1 and 2: Joint High Speed Vessel, Logistics Support Vessel, Intratheater Airlift, Petroleum Oil Lubricants Vessel, Containerships, Civil Air Reserve Fleet (CRAF) Passenger, CRAF Cargo, Strategic Airlift, Roll-On/Roll-Off Vessels, and Air Refueling.

¹ Department of Defense, *Mobility Capabilities and Requirements Study 2016* (Washington, D.C., Feb. 26, 2010).

Because of GAO's work assessing the 2005 Mobility Capabilities Study,² we reviewed, at your request, the MCRS-16 to determine the extent to which it provides useful information to decision makers. In response to your request, we assessed the extent to which the MCRS-16 report addressed its stated objectives. Within the context of relevant generally accepted research standards, we also examined each of the mobility issues cited above in relation to the study's objectives. While this report's executive summary is unclassified, we considered information included in the classified report of the MCRS-16, and our findings are supported by both the classified and unclassified portions of the report.

According to its study plan, the MCRS-16 was to accomplish the following five objectives:

- determine the Joint Deployment Distribution Enterprise³ needed to support the National Defense Strategy in the 2016 time frame;
- identify the capabilities and requirements to deploy, employ, sustain, and retrograde joint forces in support of the National Defense Strategy;
- determine capability gaps (shortfalls)⁴ and overlaps (excesses)⁵ associated with the programmed mobility force structure;
- provide a risk assessment; and
- provide insights and recommendations to support the Quadrennial Defense Review and decisions regarding future defense programs.

To inform DOD's 2010 Quadrennial Defense Review⁶ and support decisions regarding future mobility force structure, the MCRS-16 developed three demanding cases of conflicts/natural disasters with multiple scenarios that occur concurrently over a 7-year period and require the use of mobility capabilities. The MCRS-16 used approved DOD planning scenarios to develop the three cases. For example, in one case, U.S. forces might be required to conduct a large land campaign and a long-term irregular warfare campaign, as well as respond to homeland defense missions. In another case, U.S. operations might include two nearly simultaneous conventional campaigns,

² See GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, GAO-06-938 (Washington, D.C.: Sept 20, 2006).

³ The Joint Deployment Distribution Enterprise (JDDE) is the complex of equipment, procedures, doctrine, leaders, technical connectivity, information, shared knowledge, organizations, facilities, training, and materiel necessary to conduct joint distribution operations. U.S. Transportation Command serves as the single synchronizing element on behalf of, and in coordination with, the JDDE community and establishes processes to support combatant commanders.

⁴ According to DOD, a capability gap is the inability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. The gap may be the result of no existing capability, lack of proficiency or sufficiency in existing capability, or the need to replace an existing capability. A shortfall may result from a lack of forces, equipment, personnel, materiel, or capability, and is reflected as the difference between the required resources and those available to a combatant commander. When a lack of resources would adversely affect the command's ability to accomplish its mission, it is described as a shortfall.

⁵ For this report, overlap and excess are used interchangeably. An overlap (excess) can occur when the military seeks to achieve a desired effect by performing tasks under specified standards and conditions and redundant capabilities exist to accomplish a mission or task and the overlap is determined to be operationally undesirable or excessive.

⁶ Department of Defense, *Quadrennial Defense Review Report February 2010* (Washington, D.C., Feb. 1, 2010).

while also supporting three nearly simultaneous domestic events and other operations.

We reviewed the unclassified executive summary⁷ and the classified report of the MCRS-16, the study's terms of reference, and study plan. Consistent with our work concerning the 2005 Mobility Capabilities Study, we also used appropriate, relevant generally accepted research standards in this review of the MCRS-16 to assess as many aspects of the MCRS-16 as possible. These standards define a well-documented and clearly presented study and were accumulated from a number of research organizations, including DOD, GAO, and private research centers. The standards are further detailed in enclosure II. According to generally accepted research standards, in a well-designed study, the study plan is followed and deviations from the study are documented and explained. We limited our report to the extent to which the MCRS-16 met its five study objectives.

We met with the MCRS-16 study leaders to obtain further context and information concerning the conduct of the study as it was presented in the report. See enclosure II for a detailed scope and methodology. We conducted this performance audit from March 2010 to December 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Summary

The Mobility Capabilities and Requirements Study 2016 was to report on five study objectives. We found that two of the five study objectives were clearly addressed. However, we found that the study did not clearly or fully address the three remaining objectives. For example:

- The MCRS-16 did not clearly address its objective to identify gaps (shortfalls) and overlaps (excesses) concerning any of the ten DOD mobility systems in figure 1 and 2. Concerning shortfalls, the MCRS-16 reported that the C-130 aircrew force level is not adequate to meet demands in at least one scenario. However, the MCRS-16 also found that the current C-130 aircraft fleet exceeds the demand for the three MCRS-16 cases that were used to define the conflicts to be modeled. DOD officials told us that there is no C-130 shortfall. As a result, it is unclear whether there is sufficient C-130 capacity when, as stated in the report, the C-130 crew force structure cannot sustain steady-state operations in combination with a conflict. Concerning excesses, the MCRS-16 suggests that there is unused capacity in Joint High Speed Vessels—a system currently in acquisition—but does not identify this unused capacity as potentially unnecessary excess or needed operational reserve.
- The MCRS-16 study did not fully address its stated objective to include risk assessment associated with any of the ten mobility systems depicted in figure 1 or 2. DOD officials acknowledged that a risk assessment was not done for these mobility systems, but also stated that risk was considered in the warfight analysis

⁷ See Department of Defense, *Mobility Capabilities and Requirements Study 2016*.

done for the study. However, this warfight analysis risk was briefly described but not discussed in the study report. Concerning the lack of mobility systems risk assessments, the study described, for example, the Offshore Petroleum Discharge System as a critical combat enabler and stated that a single system is insufficient to meet the demands of two overlapping land campaigns. However, the study report did not identify the risk associated with this lack of capability.

- The MCRS-16 did not fully address the objective to provide insights and make recommendations. The study provided some insights and made one general recommendation regarding mobility: that the department should continue to explore strategies that seek to mitigate the adverse impacts of infrastructure constraints by reducing reliance on destination infrastructure wherever possible. However, we identified other instances where explicit recommendations may have been useful. Although DOD's analysis raised questions about the potential for shortfalls and excess capabilities, the report did not make recommendations to address or further study these issues.

Generally accepted research standards establish that a quality study follows its study plan, explains and documents deviations from the study plan, addresses study objectives, and presents study results in a clear manner. MCRS-16 study leaders told us that they believe the study report contains the information DOD leaders need to make mobility decisions. We agree that the study contains some useful information and is based on rigorous case studies that test the mobility system. However, we believe that additional information is needed to fully address some study objectives and make DOD's analysis more complete and relevant. Without additional information in some areas, decision makers at DOD and in Congress may not have all relevant information to ensure that defense mobility capabilities and requirements are sized most effectively and efficiently to support U.S. defense strategy. Therefore, we are making four recommendations to the Secretary of Defense: to explicitly identify shortfalls and excesses in mobility found in the MCRS-16, provide a risk assessment for the shortfalls and excesses associated with mobility systems identified in the MCRS-16, recommend mitigation strategies where necessary, and provide these analyses to decision makers in DOD and in Congress.

In written comments on a draft of this report, DOD disagreed with our four recommendations. In addition, DOD provided technical comments, which we have incorporated as appropriate. DOD's comments and our evaluation of them are discussed in detail later in this report. Enclosure III contains the full text of DOD's letter and technical comments, and our responses to the technical comments.

Enclosure I of this report addresses 14 mobility issues discussed in the MCRS-16 Executive Summary.

Background

The MCRS-16 is the second mobility capabilities study since September 11, 2001, and the first updated assessment since the 2005 Mobility Capabilities Study.⁸ In our previous review of the 2005 Mobility Capabilities Study, we suggested that Congress and other decision makers exercise caution in using the Mobility Capabilities Study to make programmatic investment decisions. We recommended that future mobility studies develop models and data for critical missions. DOD concurred with this recommendation, and in the MCRS-16 DOD included mobility demands for homeland defense and other missions. Additionally, we recommended that future studies incorporate both mobility and warfighting metrics. DOD again concurred, and in the MCRS-16 DOD employed the million-ton-miles per day metric to measure strategic airlift requirements. We also recommended that the Secretary of Defense include an explanation of how ongoing and follow-on studies and modeling and data limitations can affect findings of any subsequent studies, but DOD did not agree with this recommendation.

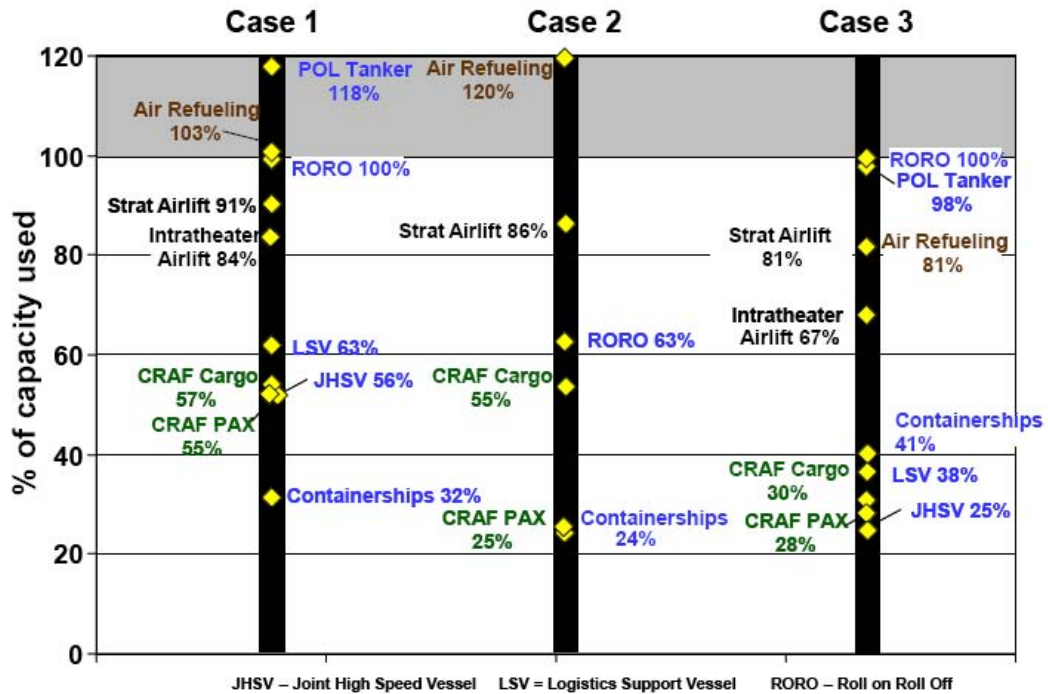
At the direction of the Secretary of Defense, the MCRS-16 analyzed aspects of the evolving National Military Strategy, including day-to-day operations, smaller engagements requiring mobility support, homeland defense missions, and military operations. The cosponsors of the MCRS-16 study, U.S. Transportation Command (USTRANSCOM) and the Office of the Secretary of Defense, Cost Assessment and Program Evaluation, modeled a broad spectrum of military engagements supporting notional strategic operations. The MCRS-16 used forces listed in the 2009 President's Budget with appropriate fiscal year 2010 adjustments and compared these capabilities with the requirements for the 2016 time frame.

In the MCRS-16, officials also considered the increased level of U.S. military engagements around the world; an increased reliance on airlift for moving equipment and supplies; the use of new special equipment, such as Mine Resistant Ambush Protected vehicles; growing use of special operations forces; establishment of the U.S. Africa Command; and increased Army and Marine Corps troop levels. The study was directed in part because of the National Military Strategy recognition of the reality of long-term U.S. involvement in globally dispersed operations and the potential for lengthy commitments to major campaigns.

After the study was completed, DOD published an unclassified executive summary of what are described as the major insights of the study in addition to a classified report. DOD provided the unclassified summary and the classified report to Congress. DOD officials told us that the chart from the MCRS Executive Summary, "Mobility System Utilization by MCRS-16 Case", reproduced below as figure 1, informed decision makers concerning gaps and excesses of mobility systems by summarizing percentages of mobility capabilities used to meet the demands of each MCRS-16 case.

⁸ The 2005 Mobility Capabilities Study was issued in December 2005. It found that projected mobility capabilities were adequate to achieve U.S. objectives with an acceptable level of risk during the period from fiscal years 2007 through 2013.

Figure 1: Mobility System Utilization by MCRS-16 Case



Source: DOD.

Assessments in the Mobility Capabilities and Requirements Study 2016 Did Not Clearly and Fully Meet Some Study Objectives

We found that the assessments in the MCRS-16 did not clearly and fully meet three of the five study objectives. Assessments of the ten mobility systems depicted in figures 1 and 2 lacked some information necessary to meet three study objectives: identifying shortfalls or excesses, providing a risk assessment, and making recommendations. We found that some DOD assessments were clearly presented and well documented. However, assessments of the mobility systems lacked clear identification of whether shortfalls or excesses are associated with the programmed mobility force structure. Additionally, none of the report’s assessments of these ten mobility systems included documentation of risk assessment. Also, the study made one recommendation, but made none concerning these depicted mobility systems. We believe that there are other instances where additional recommendations or further insights could assist decision makers in their review of DOD’s mobility investment plans. See enclosure I for a more detailed discussion of the mobility issues assessed in the MCRS-16.

Study Did Not Clearly Identify Shortfalls and Excesses in Mobility Systems Assessments

The MCRS-16 did not clearly identify shortfalls and excesses in any assessments of the ten mobility systems depicted in figures 1 and 2. The MCRS-16 study plan and Executive Summary stated that identifying shortfalls and excesses was one of five study objectives. According to generally accepted research standards, in a well-designed study, the study plan is followed and deviations from the study are documented and explained. Achieving this MCRS-16 study plan objective would have

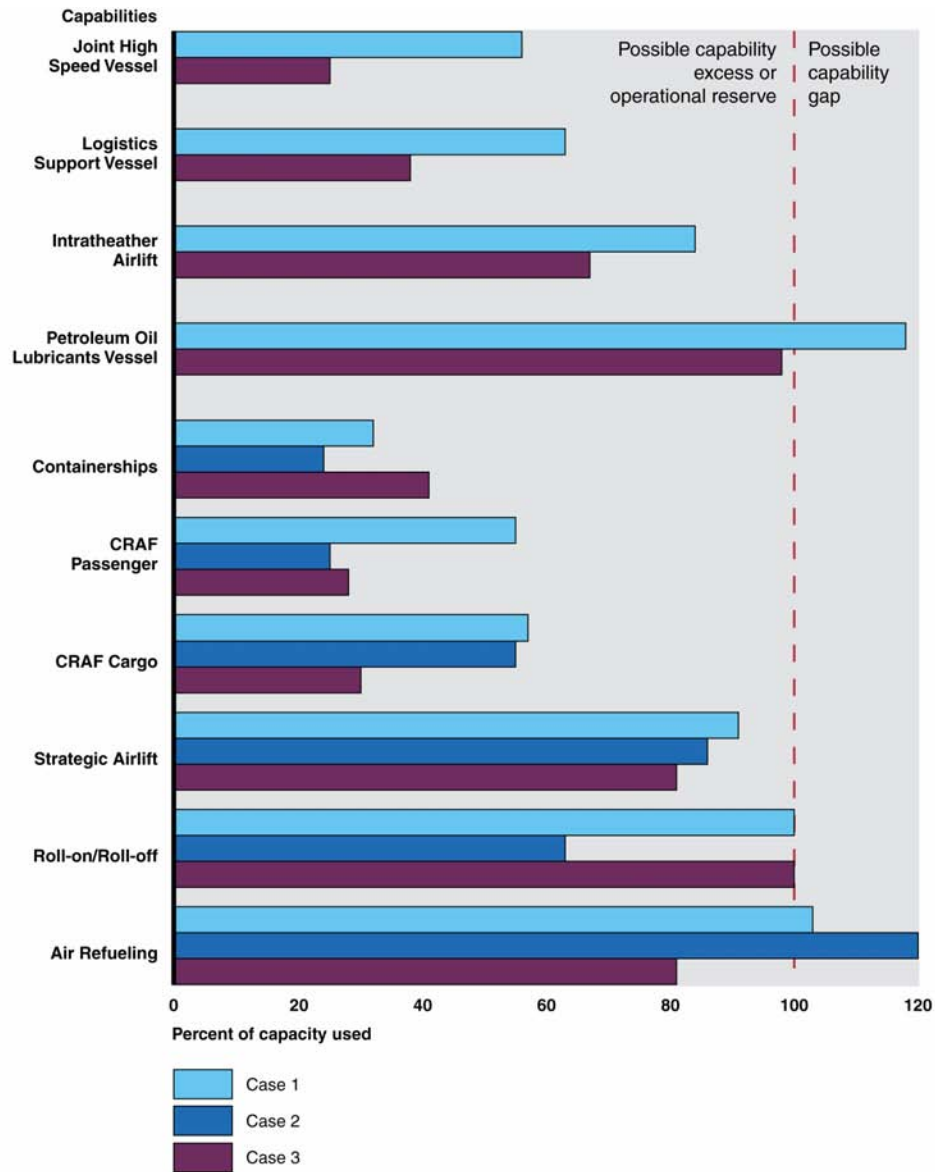
been consistent with generally accepted research standards. However, rather than explicitly stating whether a shortfall or excess exists, the MCRS-16 left it to decision makers to determine whether shortfalls and excess capacity exist in the ten mobility systems. The importance of knowing whether a shortfall exists is underscored in DOD guidance pertaining to the requirements process. DOD guidance states that for those capabilities where a shortfall exists, decision makers can, among other options, accept the operational risk or seek to address the shortfall.⁹

Shortfalls in capacity are suggested or possible in intratheater airlift; C-130 crew issues; air refueling tanker inventory; petroleum, oil, and lubricants tankers; and prepositioned equipment, but not explicitly identified as such. Similarly, excesses in capacity are suggested but not explicitly identified in strategic airlift fleet capacity, CRAF capacity, and Joint High Speed Vessels. As a result, it is unclear whether unused capacity seen in figure 2 is unnecessary excess or needed operational reserve.¹⁰ By not explicitly identifying these conditions, the report does not address the potential for damage to national security or increased costs and, as previously mentioned, does not identify the underlying risk. Furthermore, the study does not explain the significance of percentage of system capacity used depicted in figure 2 below, which is our analysis and representation of figure 1 above. Specifically, the study does not indicate whether the used and unused capacity represents potential gaps, excesses, or necessary operational reserves. In figure 2, where less than 100 per cent of the system was used, there is a potential acceptable operational reserve or there is a potential excess that could be reduced. Conversely, when in figure 2 more than 100 per cent of an available system is needed to support operations, a potential gap is suggested. However, as noted above and despite the data depicted on the figure, the written report does not identify whether a shortfall or excess exists.

⁹ Chairman of the Joint Chiefs Of Staff Instruction 3170.01G, *Joint Capabilities Integration And Development System*, (Mar. 1, 2009).

¹⁰ Operational reserves can be an emergency reserve of men and/or materiel established for the support of a specific operation.

Figure 2: MCRS-16 Potential Gaps, Excesses, and Operational Reserves in Mobility Systems



Note: All data is derived from DOD data reflected in Figure 1. DOD provided no Case 2 data for the following systems: Joint High Speed Vessel, Logistics Support Vessel, Intratheater Airlift, and Petroleum Oil Lubricant Vessels.

Study Did Not Clearly Identify Shortfalls in Mobility Systems Assessments

We found the report ambiguous in describing whether capability shortfalls existed concerning any mobility systems. For example, the report language described the air refueling tanker inventory as “not satisfy[ing] the peak demands” of some national security scenarios, suggesting a tanker shortfall. (See enc. I.) Specifically, tanker demand in one scenario is shown to exceed planned or existing tanker capacity by 20 percent as seen in figures 1 and 2. Also, the MCRS-16 found a need for as many as 646 air refueling tankers, but the current inventory is 553 air refueling tankers. Finally, in

testimony before Congress in 2010,¹¹ a DOD official characterized the tanker situation depicted in the MCRS-16 as insufficient. However, DOD officials responsible for the report told us that a tanker shortfall does not exist despite the language and data in the report. DOD officials explained that no critical mission went unserved in the 6-year period that was modeled and that the MCRS-16 did not identify tankers as a shortfall. Figure 1, taken from the MCRS-16, and figure 2, using data taken from the MCRS-16, suggest that some shortfalls exist since demand exceeded available capacity in two modeled scenarios. However, the possible shortfalls suggested by these figures are not clearly identified as shortfalls in the MCRS-16 report; instead, the report simply notes that demands were not satisfied. Ambiguity about whether shortfalls exist means that the study did not meet its study objective of identifying shortfalls.

In other DOD assessments, it is similarly unclear if a capacity shortfall exists in any mobility systems. For example, there is ambiguity concerning a possible C-130 shortfall because the MCRS-16 states that there is sufficient aircraft but also states that the crew structure cannot sustain steady-state operations in combination with a conflict. Specifically, the MCRS-16 reported that the current C-130 aircraft fleet exceeds the demand for the three MCRS-16 cases, and therefore DOD officials told us there is no C-130 shortfall. However, DOD officials responsible for the MCRS-16 also told us that the crew force issue was not a shortfall. We believe a shortfall exists if a C-130 crew force cannot meet national security requirements. While the study states that there are enough aircraft but not enough aircrews, it does not identify this as a shortfall. Figures 1 and 2 suggest unused C-130 capacity or a possible C-130 excess. If decision makers at DOD and in Congress are to be informed concerning C-130 issues, additional and clear information is required.

Study Did Not Clearly Identify Excesses in Mobility Systems Assessments

The MCRS-16 also did not clearly identify excess capacity in any mobility system assessments of the mobility force structure. The MCRS study plan and Executive Summary stated that identifying excesses was one of the five study objectives. However, the MCRS-16 uses wording to suggest possible excesses in specific mobility platforms but stops short of explicitly stating whether an excess exists. Discussing the impact of excesses on the military, the Secretary of Defense has said that a dollar spent for capabilities excess to real needs is a dollar taken from a capability the military does need.

We found the report ambiguous in describing whether there is excess capability regarding the strategic airlift fleet of C-17 and C-5 aircraft. In response to earlier GAO work,¹² DOD said that the MCRS-16 would set the stage to address the cost-effectiveness of the strategic airlift mix and recommend C-5 retirements. While the MCRS-16 determined that the fleet capacity exceeded peak demand by about 9 percent, the report did not specify whether there were too many or too few C-17 or C-

¹¹ *Air Mobility Programs: Hearing before the Air and Land Forces Subcommittee of the Committee on Armed Services*, 111th Cong. (Apr. 28, 2010) (testimony of Brig. Gen. Michelle D. Johnson, USAF, Director for Strategy, Policy, Programs, and Logistics, U.S. Transportation Command).

¹² See GAO, *Defense Acquisitions: Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50 (Washington, D.C.: Nov. 21, 2008).

5 aircraft in the fleet mix. Specifically, the MCRS-16 did not identify a minimum or maximum number of C-17s in an optimum fleet or whether an excess exists. The report simply establishes that some modeled fleet mixes produced more capacity than was required. Similarly, the MCRS-16 did not identify any excess C-5s and it did not identify the required number of C-5s, but the Air Force has announced its intention to retire C-5 aircraft.¹³ However, the MCRS-16 did not identify the most combat-effective or the most cost-effective fleet.

Similarly, the MCRS-16 does not clearly identify whether excess capacity exists in other important areas. For example, DOD's assessments are unclear regarding Joint High Speed Vessels. (See fig. 2.) The MCRS-16 report found that 56 percent of Joint High Speed Vessel capacity was used in one demanding MCRS-16 case and 25 percent in another case. However, the report did not specify whether the unused Joint High Speed Vessel (44 percent in case 1 and 75 percent in case 2) constitutes excess capability. Moreover, the MCRS-16 was to consider Joint High Speed Vessels in service through 2016 and only nine of these vessels are reportedly forecast to be in service by fiscal year 2015. However, total acquisition is reportedly forecast to include 23 vessels. Decision makers could be informed by an MCRS-16 assessment of whether the unused Joint High Speed Vessels capacity constitutes excess capability and whether acquisition of additional JHSVs is warranted.

A third area where an excess capability is suggested but not confirmed by the MCRS-16 is in CRAF. The MCRS-16 report found that the most demanding scenarios used 55 percent of CRAF passenger assets and 57 percent of cargo assets. While CRAF demands increased over previous usage (cargo tonnage and passenger requirements were up 24 and 15 percent, respectively), the MCRS-16 study uses wording and percentages to suggest that planned CRAF capacity may be in excess of that which is needed. However, the study did not specify whether unused CRAF capacity (as much as 43 percent in case 1 and 45 percent in case 2) constitutes excess capability. Decision makers who review the CRAF program and seek efficiencies could be informed by an MCRS-16 assessment concerning potential excess capacity.

Study Did Not Provide Any Risk Assessments of Mobility Systems

The MCRS-16 did not achieve its study objective to provide risk assessments for the mobility force structure. The report has no discussion concerning mobility system risk, although risk assessment is a specific objective in the study plan. None of the 10 DOD mobility systems shown in figure 1 and 2 included a risk assessment.¹⁴ According to the National Defense Strategy, risk assessment is an essential part of balancing risks, given limited resources, and requires identifying the potential for damage to national security by measuring the probability of occurrence and the consequences should the underlying risk remain unaddressed. Military risk is defined

¹³ According to the DOD C-5 Reliability Enhancement and Re-engining Program (RERP), Combined Operational and Live Fire Test and Evaluation Report of October 2010, the C-5M undergoing operational testing is currently operationally effective but is operationally unsuitable. The MCRS-16 used C-5Ms in calculating the ability of the strategic air fleet.

¹⁴ Both excess capacity and shortfall in capacity can constitute risk. For excess capacity, there can be risk that resources needed for higher priorities are wasted; for capacity shortfalls, there can be risk to an operation.

as DOD's ability to adequately resource and execute military operations in support of the strategic objectives of the National Military Strategy. There is operational risk to national security when there is a shortfall and needs are not met, as well as military risk when unnecessary excess capability exists. Discussing the impact of excesses on the military, the Secretary of Defense has said that a dollar spent for capabilities excess to real needs is a dollar taken from a capability the military does need. According to generally accepted research standards, in a well-designed study the study plan is followed and deviations from the study are documented and explained. Achieving the MCRS-16 objective on risk assessment would have been consistent with relevant generally accepted research standards. Further, the value of risk assessments is underscored in the National Defense Strategy and the Quadrennial Defense Review, which the MCRS-16 is intended to support. The strategy and the Quadrennial Defense Review describe two types of risk relevant to mobility force structure: operational risk and future risk.¹⁵ However, risk concerning mobility systems was not discussed in the MCRS-16.

DOD and congressional decision makers have acknowledged the importance of risk assessments, and risk assessment was included in the preceding mobility study. DOD officials told us that the main metric used in the MCRS-16 was whether the United States prevailed in a conflict. However, this metric does not measure the risk associated with mobility systems. According to DOD testimony, DOD has previously used mobility metrics in mobility studies and quantified risk. A DOD official said that DOD's 2005 Mobility Capabilities Study assessed risk in the intratheater force structure and described a fleet containing 395 to 674 C-130s as moderate risk. By comparison, DOD's MCRS-16 reports that a fleet of 401 C-130s exceeds demands but does not describe the level of risk associated with this size force. Without a risk assessment, it is unclear whether resources are wasted on excess capability. DOD officials told us that rather than reporting risk associated with particular mobility systems, risk was considered solely on whether warfight objectives were achieved. While warfighting risk metrics can inform decision making concerning overall mobility capabilities, we believe that decision makers can benefit from knowing the risk associated with particular mobility systems as they make force structure decisions.

Study Did Not Fully Provide Insights and Recommendations

The MCRS-16 did not fully achieve the study objective to provide insights and recommendations to support decisions regarding mobility programs. The MCRS-16 study plan and Executive Summary stated that providing insights and recommendations was one of five study objectives. However, in some DOD assessments, the MCRS-16 uses wording and data to suggest possible shortfalls or excesses in specific mobility platforms but did not make recommendations about necessary mitigation. By not explicitly addressing mitigation as described in the National Defense Strategy, the report did not fully inform decision makers concerning the potential for damage to national security and, as previously

¹⁵ According to the National Defense Strategy, operational risks are those associated with the current force executing the strategy successfully within acceptable human, material, financial, and strategic costs. Future challenges risks are those associated with DOD's capacity to execute future missions successfully against an array of prospective future challengers.

mentioned, did not identify underlying risk. According to generally accepted research standards, in a well-designed study, the study plan is followed and deviations from the study are documented and explained. Achieving this MCRS-16 study plan objective would have been consistent with generally accepted research standards and may have informed decision making concerning specific mobility systems.

The MCRS-16 provided one recommendation and some information concerning a number of mobility systems, but it could have provided more detailed insights that would have more fully informed decisions regarding those systems. As previously discussed, the MCRS-16 reported that airborne tanker demand exceeded tanker capacity by 20 percent in one of the scenarios, noting that a modernized tanker fleet would require fewer aircraft to meet the same demand seen in the combat scenarios. However, the study does not report that the modernization would have little impact based on the current production schedule because no more than 30 modernized aircraft are forecast into the fleet of 474 tankers in the MCRS-16 time period. Similarly, the MCRS-16 showed that 44 percent of Joint High Speed Vessels were not used in the most demanding scenarios, but made no recommendations concerning the ongoing acquisition of this system. The study described the offshore petroleum discharge system as a critical combat enabler and stated that a single system is insufficient to meet the demands of two overlapping land campaigns. This is a useful insight because, as stated in the MCRS-16, the ability to prosecute two nearly simultaneous conventional campaigns remains a cornerstone to U.S. defense strategy. However, the MCRS-16 makes no recommendation concerning this mobility program and whether mitigation is required. Also, it does not identify the number of Offshore Petroleum Discharge Systems that would be sufficient.

Another example where additional insight could have been provided concerns CRAF and its relationship to the number and capability of military cargo aircraft. The study reports that cargo requirements for military aircraft amounted to 32.7 million-ton-miles per day¹⁶ in its highest demand. However, the study does not provide the insight that usage of CRAF civilian cargo aircraft increased by 4.9 million-ton-miles per day. This insight may be important for decision makers who are currently considering retiring 22 C-5 aircraft; however, the study made no recommendation in this area. DOD officials told us that in some instances the study avoided recommendations to afford DOD leadership maximum flexibility. We believe that in these instances and others, more detailed information would support the MCRS-16 goal of informing programmatic decision making and more fully satisfy the MCRS-16 objective of providing insights and recommendations.

Conclusions

While some of the MCRS-16 reflects DOD's adherence to generally accepted research standards, it may not fully provide the level and type of information that would allow

¹⁶ According to USTRANSCOM, million-ton-miles per day is a measure of aircraft performance and reflects how much cargo can be delivered over a given distance in a given period of time.

DOD and congressional decision makers to clearly understand what mobility systems are needed to meet requirements, how many are needed, and what the risks are of having too many or not enough of each asset to meet the defense strategy. Additional information is needed to fully address some study objectives and make DOD's report more complete. Without a clear picture of the shortfalls and excesses that exist in the mobility system, the potential risks inherent in those shortfalls and excesses, and what needs to be done to mitigate those risks, decision makers at DOD and in Congress may not have all the relevant information they need to ensure that defense mobility capabilities and requirements are sized most effectively and efficiently to support U.S. defense strategy.

Recommendations for Executive Action

To provide decision makers with information necessary to assess defense mobility programs, we recommend that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to take the following four actions:

- Explicitly identify the shortfalls and excesses in the mobility systems that DOD analyzed for the MCRS-16.
- Provide a risk assessment for the potential shortfalls and excesses.
- Recommend mitigation strategies and any needed changes in force structure and planned investments resulting from the potential shortfalls and excesses in the MCRS-16 or explain why mitigation is not necessary.
- Provide this additional analysis to the Office of the Secretary of Defense and senior decision makers in DOD and in Congress for their use in further deliberations on mobility capabilities and requirements.

Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD did not agree with any of our four recommendations. DOD also stated that "The draft report erroneously asserts that the MCRS did not address three of its five objectives. Specifically, the draft report states that the MCRS failed to identify gaps and overlaps in the mobility system; did not include a risk assessment; and did not provide insights and recommendations. This finding demonstrates a fundamental lack of understanding, and consequently a misrepresentation of the MCRS, despite the significant efforts of the study team to inform GAO's assessment." DOD provided technical comments with examples of where it believed our report contained misleading information and factual errors. We disagree with some of the department's technical comments regarding the facts in our report and have addressed each of the department's comments in enclosure III. We have revised the report to incorporate DOD's technical comments, as appropriate. We have also added a new figure (Figure 2) to the report along with an explanation of the information depicted in the figure.

DOD did not agree with our recommendation that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S.

Transportation Command to explicitly identify the shortfalls and excesses in the mobility systems that DOD analyzed for the MCRS-16. DOD stated that the MCRS explicitly identifies shortfalls and excesses in the mobility system. In its response, DOD identified strategic airlift as an example of such an excess. However as we noted in the report, unused capacity, which the MCRS did identify, could be considered unnecessary excess capacity or a necessary operational reserve. As seen in figures 1 and 2, at least seven mobility systems in the MCRS have unused capacity, but the MCRS does not report whether the overlap is operationally acceptable or if alternatively an excess exists. As a result, the MCRS does not provide insight as to whether or not these are excesses or operational reserves – although providing this information was one of the objectives of the MCRS. As an example, only 56 per cent of Joint High Speed Vessels (JHSVs) are used in the most demanding scenario but the MCRS does not characterize the remaining 44 per cent of the JHSVs as excess. We continue to believe that explicitly identifying the shortfalls and excesses in the mobility systems, an unmet objective of the MCRS, is useful to decision makers and could potentially result in cost savings and increased efficiencies.

DOD also did not agree with our second recommendation that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to provide a risk assessment for the identified potential shortfalls and excesses. In its response, DOD stated the MCRS includes a risk assessment which links the ability of the mobility system to support force closure with a comprehensive set of campaign risk metrics. DOD further stated that risk was assessed on the ability of US forces to achieve specific campaign objectives. We believe that decision makers need to know the risks associated with having too little or too much of specific mobility systems and completing risk assessment was a study objective. Despite DOD's statement that the study included campaign risk assessments, it did not include mobility system risk assessments for the ten mobility systems (figures 1 and 2) that have possible excesses and shortfalls. For example, the MCRS reports that in two of the three cases modeled, the sealift fleet had no appreciable reserve and the result was some operational delays. However, the MCRS makes no mention of the risk represented by these delays since, according to the MCRS study leaders, U.S. objectives were met in the modeled scenarios. In another example, the MCRS reports that a single Offshore Petroleum Discharge System is insufficient to meet the demands of two overlapping land campaigns but it does not quantify the risk involved with this seeming shortfall. We believe that this is important, not only because identifying risk is a study objective, but because, as the MCRS states, the ability to prosecute two nearly simultaneous conventional campaigns remains a cornerstone of U.S. defense. In a previous mobility study—the Mobility Capabilities Study 2005—DOD reported the risks associated with the mobility assets studied. We continue to believe that quantifying the risk associated with specific mobility systems could help to inform decision makers who must allocate scarce resources, enabling them to address the most risk at the least cost.

DOD did not agree with our third recommendation that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command recommend mitigation strategies and any needed changes in force structure and planned investments resulting from the identified potential shortfalls and excesses in the MCRS-16 or explain why mitigation is not necessary. In its response, DOD stated that determining changes to force structure, planned investments, and mitigation strategies is beyond the scope of the MCRS. However, the MCRS explicitly states that the goal of the study was to identify risks associated with limitations of the mobility system and to provide insights concerning ways to mitigate those limitations. In one instance, the MCRS found that C-130 aircraft inventory did not satisfy the peak demands in one of the three cases assessed because of crew issues, but made no recommendation and provided no mitigation. As stated in our report, we continue to believe that this study should inform decision makers concerning the mobility systems listed in figures 1 and 2. Specifically, how many are needed, and what the risks are of having too many or not enough. We believe that the lack of recommendations and suggested mitigations reflect a missed opportunity to provide DOD officials with important information concerning mobility systems. We believe that a study of this magnitude looking to year 2016 should result in concrete observations and recommendations especially when doing so is consistent with published objectives.

DOD did not agree with our fourth recommendation that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to provide this additional analysis to the Office of the Secretary of Defense and senior decision makers in DOD and in Congress for their use in further deliberations on mobility capabilities and requirements. In its response, DOD stated that the MCRS met the needs of the Department's senior leaders. We believe that the needs of decision makers within DOD and in Congress were captured in the MCRS objectives of identifying gaps and excesses, quantifying risks, and providing insights and recommendations—none of which were fully met. Accomplishing these objectives ensures that DOD can satisfy the demands of the National Military Strategy and possibly increase efficiencies and cost savings.

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We are sending copies of this report to the Secretary of Defense and the Commander, U.S. Transportation Command. This report also is available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staffs have any questions regarding this report, please contact me at (202) 512-8365 or solisw@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff

who made major contributions to this report include Ann Borseth, Assistant Director; Jenny Hwang; Ron La Due Lake; Greg Marchand; Charles Perdue; Richard Powelson; Michael Silver; and Steve Woods.

A handwritten signature in black ink, appearing to read 'W. Solis', with a long horizontal flourish extending to the right.

William M. Solis
Director
Defense Capabilities and Management

Enclosures - 3

Related GAO Products

Quadrennial Defense Review: 2010 Report Addressed Many but Not All Required Items. [GAO-10-575R](#). Washington, D.C.: April 30, 2010.

Defense Acquisitions: Strategic Airlift Gap Has Been Addressed, but Tactical Airlift Plans Are Evolving as Key Issues Have Not Been Resolved. [GAO-10-67](#). Washington, D.C.: November 12, 2009.

Defense Logistics: Department of Defense's Annual Report on the Status of Prepositioned Materiel and Equipment Can Be Further Enhanced to Better Inform Congress. [GAO-10-172R](#). Washington, D.C.: November 4, 2009.

Military Airlift: DOD Should Take Steps to Strengthen Management of the Civil Reserve Air Fleet Program. [GAO-09-625](#). Washington, D.C.: September 30, 2009.

Defense Acquisitions: Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix. [GAO-09-50](#). Washington, D.C.: November 21, 2008.

Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report. [GAO-06-938](#). Washington, D.C.: September 20, 2006.



MCRS-16 Report: Strategic Airlift Fleet Capacity

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Million-ton-miles per day (MTMs/D): A measure of aircraft performance that reflects how much cargo can be delivered over a given distance in a given period of time.

Strategic airlift: The C-5 Galaxy and the C-17 Globemaster aircraft form the core of the Department of Defense's (DOD) capabilities to provide worldwide reach for both military and humanitarian operations.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

DOD's Assessment

The MCRS-16 reported that the capacity of the department's strategic airlift fleet exceeds its highest demand of 32.7 MTMs/D, the number of MTMs/D that DOD determined is required to meet national security needs. According to the MCRS-16 report, DOD's strategic airlift fleet capacity exceeds the peak demand in all three MCRS-16 cases.

GAO's Assessment of This Item

The MCRS-16 assessment of strategic airlift fleet capacity does not fully address its study objectives to identify overlaps (excesses) and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards.

The strategic air fleet of 223 C-17 and 111 C-5 aircraft provides a capability (35.9 MTMs/D) that exceeds requirements (32.7 MTMs/D) by more than 9 percent. While the MCRS-16 determined that the fleet capability exceeds peak demand, the report does not specify whether there are too many C-17s or too many C-5s. DOD officials told us that the study was not intended to determine the most cost-effective or combat-effective fleet.

In 2008,¹ we recommended that DOD identify the number of C-17 aircraft and the number of C-5 aircraft needed to accomplish the strategic airlift mission. At that time, DOD stated that the MCRS-16 would set the stage to address cost-effectiveness issues and aircraft retirement issues. In July 2010, a DOD official described the MCRS-16 as a critical tool to be used in making difficult decisions. The MCRS-16 did not identify any excess C-5s and it did not identify the required number of C-5s. Similarly, the MCRS-16 did not identify a minimum or maximum number of C-17s in an optimum fleet or whether an excess exists—contrary to DOD's congressional testimony. However, DOD has proposed elimination of 22 C-5As.

Additionally, the MCRS-16 assessment does not include a risk assessment that quantifies risk associated with the strategic fleet. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

¹ GAO, *Defense Acquisitions: Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50 (Washington, D.C.: Nov. 21, 2008).



GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Intratheater airlift: This airlift involves air movement and delivery of personnel and equipment within a military theater.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

MCRS-16 Report: Intratheater Airlift

DOD's Assessment

The MCRS-16 report found that since peak demand for strategic airlift and intratheater airlift are not concurrent, the C-17 aircraft also can support intratheater missions usually flown by the C-130 aircraft without adding to the peak demand for C-17s.

GAO's Assessment of This Item

The MCRS-16 report does not fully address the C-17 aircraft's role in intratheater missions because the assessment does not fully identify shortfalls and it does not provide a risk assessment of intratheater airlift. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards.

It is unclear whether the programmed number of C-130 aircraft can satisfy intratheater demands without the C-17s. In the modeled scenarios, available C-17s were used to augment intratheater missions. However, the availability of C-17s used in intratheater missions is conditionally based on assumptions used in modeling that are not explicitly stated in the report. For example, a modeling assumption concerning the amount of time between the start of conflicts may free C-17s for the intratheater mission and this information could be useful as decision makers consider the number of C-17s required. Additionally, the study reported—and Department of Defense officials confirmed—that the MCRS-16 did not consider the additional intratheater requirement to provide airlift support directly to the Army. As of April 2010, 30 to 40 C-130s were dedicated to this mission in Afghanistan. The MCRS-16 report also does not identify the risk associated with the modeled C-130 force.

The MCRS-16 assessment does not include a risk assessment that quantifies risk associated with intratheater lift. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.



MCRS-16 Report: Homeland Defense

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study (MCRS-16) report address its stated objectives?

DOD's Assessment

The MCRS-16 report found that a combination of 12 Department of Defense (DOD) aircraft and 36 commercial aircraft is sufficient to meet the peak airlift requirement in support of homeland defense scenarios, including disasters and terrorist incidents. The MCRS-16 analysis showed that using additional DOD aircraft was not faster than using ground transportation, showing that ground transportation was able to move forces and equipment 10 times faster than air.

GAO's Assessment of This Item

The MCRS-16 assessment of homeland defense does not fully address its study objective to provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

Definition of Terms

National Response Plan: This plan provides mechanisms for expedited and proactive federal support to ensure that critical life-saving assistance and incident containment capabilities are in place to respond quickly and efficiently to catastrophic incidents.

Although the Department of Transportation is the lead agency for providing transportation in disaster areas under the National Response Plan, DOD provides support for homeland defense missions. We found that the report does not explain the risk associated with using 48 aircraft to service its homeland defense scenarios. In the past, DOD has used a higher number of aircraft in response to actual domestic crises. In response to Hurricane Katrina, it was reported that federal officials used 346 helicopters and 68 fixed-wing aircraft to fly more than 16,000 missions. DOD officials explained that the reduced numbers of aircraft will satisfy mission requirements to move chemical, biological, radiological, nuclear, and high-yield explosive response units; the MCRS-16 report did not provide additional information to support this conclusion.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.



GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

End strength: This is the maximum number of personnel each of the military services is authorized to have on the last day of the fiscal year (September 30).

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

MCRS-16 Report: Ground Force End Strength

DOD's Assessment

The MCRS-16 report found that it does not affect the peak demand for strategic airlift to add ground force end strength to provide a larger rotational pool of forces to sustain long-duration stability operations.

GAO's Assessment of This Item

The MCRS-16 assessment of ground force end strength addresses the MCRS-16 study objectives to determine mobility requirements, identify mobility capabilities, determine shortfalls/excesses, and provide insights to support the Quadrennial Defense Review and decisions regarding future defense programs. However, the MCRS-16 assessment does not fully address its study objective to provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

The Department of Defense's assessment of end strength is clearly presented, but risk is not addressed. The case study notes that in general, increased end strength has an impact on force rotations and tour lengths, but little or no effect on the number of forces initially committed in operational plans.



MCRS-16 Report: Civil Reserve Air Fleet Capacity

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

DOD Reported

The MCRS-16 report found that projected CRAF cargo capacity is significant and greatly exceeds the requirements for all study cases. The MCRS-16 study also reported the number of CRAF aircraft used in support of the cases. DOD relied on CRAF as the primary means of delivering passengers and bulk air cargo.

GAO's Assessment of This Item

The MCRS-16 assessment of CRAF does not fully address its study objectives to identify excesses and provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

In the MCRS-16 Executive Summary, figure 1 shows that 57 percent of CRAF cargo capacity and 55 percent of CRAF passenger capacity was used in the most demanding case for CRAF. However, the report does not indicate whether the unused capacity (43 percent for cargo and 45 percent for passenger) constitutes excess capacity.

We also found that the MCRS-16 increased reliance on CRAF from previous studies, but did not directly report this increase or fully assess the risk associated with more reliance on the availability of commercial aircraft and a decreased use of military aircraft. In the MCRS-16 report, CRAF cargo usage increased by 24 percent from the capacity previously planned for DOD use and CRAF passenger usage increased by 15 percent. In testimony before Congress, a DOD official incorrectly stated that planned CRAF usage is roughly equivalent in the previous mobility study and in the MCRS-16.

Definition of Terms

Civil Reserve Air Fleet (CRAF): In the CRAF program, the Department of Defense (DOD) contracts for services of specific commercial aircraft during national emergencies when the need for airlift exceeds the capability of military aircraft.

In 2009,² we reported that DOD had not assessed the level of risk associated with declining passenger capabilities and we expressed concerns regarding aspects of CRAF cargo capability. The MCRS-16 report did not address CRAF passenger capability vulnerabilities, and the finding cited only the sufficiency of CRAF cargo capacity.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

² GAO, *Military Airlift: DOD Should Take Steps to Strengthen Management of the Civil Reserve Air Fleet Program*, [GAO-09-625](#) (Washington, D.C.: Sept. 30, 2009).



MCRS-16 Report: C-130 Crew Issues

GAO's Reporting Objective

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

C-130 aircraft: First produced in 1962, the C-130 aircraft perform the tactical/intratheater portion of the airlift mission. They are capable of operating from unimproved fields and can accommodate a wide variety of oversized cargo.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

DOD Reported

The MCRS-16 report found that a fleet of 401 C-130 aircraft exceeds the peak demand in all three analyzed cases, with the highest demand being 335 aircraft. However, based on current total force planning objectives, the C-130 crew force structure cannot sustain steady state operations in combination with a long-duration irregular warfare campaign.

GAO's Assessment of This Item

The MCRS-16 assessment of the C-130 aircraft crew issue does not fully address its study objectives to identify shortfalls and provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

We found the report ambiguous as to whether a capability shortfall exists concerning C-130s. There is ambiguity concerning a possible C-130 shortfall because the MCRS-16 states that there are sufficient aircraft but the C-130 crew force structure cannot sustain steady-state operations in combination with a conflict. Although the MCRS-16 report found that 401 C-130 aircraft exceeds peak demand (335 aircraft), the current crew force level is not adequate to meet peak demand needs in one scenario. Department of Defense (DOD) officials responsible for the MCRS-16 report told us that the crew force issue was not a shortfall; however, in congressional testimony, a DOD official stated that under one scenario, even if aircraft were available, it is the crew force that is not able to sustain operations over time. We believe that a shortfall exists if a C-130 crew force cannot meet national security requirements. If decision makers at DOD and in Congress are to be informed concerning C-130 issues, additional information is required.

MCRS-16 objectives also required providing a risk assessment, but we found that the MCRS-16 did not describe the risk associated with a C-130 force level that cannot meet requirements. The previous mobility study assessed moderate risk to a C-130 force structure as from 395 to 674 aircraft. The MCRS-16 does not fully explain how the requirement was reduced to 335 aircraft.



MCRS-16 Report: Air Refueling Tanker Inventory

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

DOD Reported

The MCRS-16 report found that the tanker inventory for 2016 does not satisfy the peak demands of two of three specified cases (scenarios), and air refueling demand exceeded existing capability by 20 percent in one case and 3 percent in another case.

Additionally, the report stated that a modernized fleet would require fewer aircraft to meet the same demand because the modernized fleet would provide lower depot down-time and greater capability.

GAO's Assessment of This Item

The MCRS-16 assessment of tanker inventory does not fully address the study objectives to identify shortfalls and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

We found the report ambiguous as to whether a capability shortfall exists concerning tankers. The report language described tanker inventory as “not satisfy[ing] the peak demands” of national security scenarios, suggesting a tanker shortfall. Specifically, tanker demand is shown to exceed planned or existing tanker capacity by 20 percent in one case. Also, the MCRS-16 found a need for as many as 646 air refueling tankers, but the current inventory is 553 air refueling tankers. Additionally, in testimony before Congress, a Department of Defense (DOD) official characterized the tanker situation as a shortfall. However, DOD officials responsible for the report told us that a tanker shortfall does not exist despite the language used in the report.

MCRS-16 objectives also required providing a risk assessment, but we found—and DOD officials confirmed—that a risk assessment for tanker inventory was not included in the report.

In testimony before Congress, a DOD official stated that the advent of the new KC-X tanker will help address the air refueling shortfall. Similarly, the MCRS-16 asserts that a modernized tanker fleet would require fewer aircraft. However, the assertion that a modernized tanker fleet would address the air refueling shortfall is not supported by the production schedule, which is forecasted to put no more than 30 modernized aircraft into the fleet of 474 tankers in the MCRS time period.

Definition of Terms

Peak demand: This is the highest requirement for a mobility capability that occurs during the period of military operations.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.



MCRS-16 Report: En Route Infrastructure

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

DOD's Assessment

The MCRS-16 report found that en route infrastructure is sufficient in all theaters to support the fuel requirements for deploying and sustaining forces.

Definition of Terms

Infrastructure: Infrastructure comprises the supporting facilities vital to global distribution operations, including ports, roads, airfields, railroads, and staging areas. U.S. Transportation Command has noted that global infrastructure is the cornerstone for globally projecting national security capabilities.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

GAO's Assessment of This Item

The MCRS-16 assessment of en route infrastructure addresses the MCRS-16 study objectives to determine mobility requirements, identify mobility capabilities, determine shortfalls/excesses, and provide insights to support the Quadrennial Defense Review and decisions regarding future defense programs. However, the MCRS-16 assessment does not address the study objective to provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.



GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Roll-on/roll-off ships: Roll-on/Roll-off ships have varying capabilities and are designed to carry rolling stock and can be loaded and unloaded by driving on and driving off.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

MCRS-16 Report: Roll-on/Roll-off Ships

DOD's Assessment

The MCRS-16 report found that despite no appreciable reserves in two of the three study cases and some operational delays, the available sealift fleet of organic, commercial, alliance, and effective U.S.-controlled roll-on/roll-off ships and containerships was sufficient to meet military objectives.

GAO's Assessment of This Item

The MCRS-16 assessment of roll-on/roll-off ships does not fully address the study objective to identify shortfalls and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

The report found that roll-on/roll-off ship capacity was sufficient. However, in two MCRS-16 modeled cases, 100 percent of roll-on/roll-off ship capacity was used and some operational delays occurred. We noted in the MCRS-16 report—and Department of Defense officials confirmed—that no appreciable roll-on/roll-off ship reserves exist. We believe that the absence of reserves could increase risk to operations, but there was no risk assessment of demand for roll-on/roll-off ships.



MCRS-16 Report: Sealift Reserves

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Petroleum, oil, and lubricants (POL) vessels: Military Sealift Command (MSC) operates four tankers that move fuel between commercial refineries and Department of Defense (DOD) storage and distribution facilities worldwide during peacetime and war. More than 90 percent of U.S. war fighters' equipment and supplies travels by sea and these four ships transport account for movement of more than 70 percent of DOD needs. When more fuel-carrying capacity is required, MSC charters additional tankers directly from the commercial market on a short-term basis.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

DOD's Assessment

The MCRS-16 reported that demand slightly exceeded capacity for POL vessels, but the demand can be mitigated easily by gaining access to the 1,980 tankers available in the world. In one case, the MCRS-16 assessed that POL vessel demand exceeded capacity by 18 percent.

GAO's Assessment of This Item

The MCRS-16 assessment of sealift reserves does not fully address the study objective to identify shortfalls and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

Although the MCRS-16 report found that in the most demanding case the requirement for POL vessels exceeded demand by 18 percent, no shortfall was reported. DOD officials told us that there is no POL vessel shortfall; however, the conclusion is not clear based on the report.

Some risk may be associated with DOD plans to requisition U.S.-flagged vessels. The MCRS-16 points out that the President has the authority in times of national emergency to requisition certain ships, but does not detail the circumstances and consequences of requisitioning. The MCRS-16 also does not detail the extent to which U.S. strategies depend on this requisitioning.



MCRS-16 Report: Prepositioned Equipment

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Prepositioned equipment: This equipment is forward-positioned materiel for use by combatant commanders to respond to contingencies. Prepositioned equipment reduces early transportation requirements and increases global responsiveness. DOD prepositions equipment at strategic locations around the world to enable it to field combat-ready forces in days, rather than the weeks it would take if equipment had to be moved from the United States to the locations of conflicts.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

DOD's Assessment

The MCRS-16 report found that prepositioned equipment was sufficient to meet the most demanding MCRS-16 case. Additionally, equipment currently prepositioned was not immediately used when the warfight began. The report identified an opportunity for further study to reevaluate the concept of employment and mix of prepositioned equipment.

GAO's Assessment of This Item

The MCRS-16 assessment of prepositioned equipment addresses the study objectives to determine mobility requirements, identify mobility capabilities, and provide insights to support the Quadrennial Defense Review and decisions regarding future defense programs. However, the MCRS-16 assessment does not fully address the study objectives to identify shortfalls and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

Low levels of prepositioned equipment—noted in the MCRS-16 report—raise concerns because shortages could add stress to the mobility system, but the risks associated with the shortages are not assessed. We found the report ambiguous as to whether a capability shortfall/excess exists concerning prepositioned equipment. While the MCRS-16 report found that prepositioned equipment was sufficient to meet the most demanding MCRS-16 case, it also notes that a majority of certain types of equipment were not used immediately. This suggests that there may be an excess in certain types of prepositioned equipment and a shortfall in other equipment.

We agree it would be useful to reevaluate of the current concept of employment and mix. We have previously reported information concerning prepositioned equipment and materiel that could further inform decision makers and we believe that shortfalls in this area remain important.³

³ GAO, *Defense Logistics: Department of Defense's Annual Report on the Status of Prepositioned Materiel and Equipment Can Be Further Enhanced to Better Inform Congress*, [GAO-10-172R](#) (Washington, D.C.: Nov. 4, 2009).



MCRS-16 Report: Continental U.S. Infrastructure

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

U.S. infrastructure: To expeditiously transport troops and materiel to ports of embarkation in times of crisis, the nation needs an extensive transportation capability within its land mass. Railroads, highways, waterways, and a fleet of railcars, buses, trucks, and barges are vital components of the overland lift system. U.S. Transportation Command's Surface Deployment and Distribution Command monitors the status of the infrastructure system, including ports, inland waterways, pipelines, and air facilities.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

DOD's Assessment

The MCRS-16 report found that the current and projected infrastructure in the continental United States is sufficient to meet the most demanding study case.

GAO's Assessment of This Item

The MCRS-16 assessment of continental U.S. infrastructure addresses the study objectives to determine mobility requirements, identify mobility capabilities, and provide insights to support the Quadrennial Defense Review and decisions regarding future defense programs. However, the MCRS-16 assessment does not address the study objective to provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.



GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

Definition of Terms

Joint high speed vessel (JHSV): A JHSV is a U.S. Army or Navy surface ship capable of transporting troops, equipment, and supplies while operating in shallow waters and reaching speeds in excess of 35 knots when fully loaded.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

MCRS-16 Report: Joint High Speed Vessels

DOD's Assessment

The MCRS-16 report found that JHSVs are critical enablers of deployment and sustainment and are sufficient to support the most demanding study case. In the most demanding case, the Department of Defense used 56 percent of available capacity.

GAO's Assessment of This Item

The MCRS-16 assessment of JHSVs does not fully address its study objectives to identify an excess and provide a risk assessment. The MCRS-16 assessment is not clearly presented or well documented, both of which are elements of generally accepted research standards. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained.

In the MCRS-16 Executive Summary, figure 1 shows that 56 percent of JHSV capacity was used in the most demanding study case and 25 percent in another case. However, the report does not indicate whether the unused capacity (44 percent in case 1 and 75 percent in case 2) constitutes excess capacity. Additionally, the MCRS-16 does not include a risk assessment of the JHSVs. The MCRS-16 was to consider JHSVs in service through 2016 and 9 JHSVs are forecasted to be in service by fiscal year 2015. However, total acquisition is reportedly forecasted to include 23 vessels, costing an estimated \$1.8 million each.



MCRS-16 Report: Offshore Petroleum Discharge Systems

GAO's Focus

To what extent does the Mobility Capabilities and Requirements Study 2016 (MCRS-16) report address its stated objectives?

DOD's Assessment

The MCRS-16 report found that a single OPDS is insufficient to meet the demands of two overlapping land campaigns.

GAO's Assessment of This Item

The MCRS-16 assessment of OPDS capacity does not address the study objective to provide a risk assessment. According to generally accepted research standards, a well-designed study includes a study plan that is followed and any deviations from the study are documented and explained. The report does not clearly describe the risk associated with one OPDS being insufficient to meet the demands of two overlapping land campaigns. Department of Defense officials confirmed that there is no risk assessment in the study about OPDS capacity. Also, the MCRS-16 does not identify or recommend how many systems would be sufficient.

Definition of Terms

Offshore petroleum discharge system (OPDS): An OPDS is a ship-borne system that can provide over 1 million gallons of petroleum to the shore where ports or terminal facilities are inadequate or nonexistent. It supports the U.S. Army, Navy, and Marine Corps.

For more information, contact Bill Solis at (202) 512-8365 or solisw@gao.gov.

Enclosure II

Scope and Methodology

To conduct our review of the 2016 Mobility Capabilities and Requirements Study 2016 (MCRS-16), we reviewed and analyzed the final MCRS-16 report, the MCRS-16 Terms of Reference, and the MCRS-16 Study Plan. We also reviewed the *National Military Strategy of the United States of America*, the *National Defense Strategy of the United States of America*, and the *National Security Strategy of the United States of America*. We interviewed study officials from the Office of the Secretary of Defense, Cost Assessment and Program Evaluation, and U.S. Transportation Command.

We relied on previous GAO work based on research literature and Department of Defense (DOD) guidance that identified frequently occurring, generally accepted research standards that are relevant for defense studies, such as the MCRS-16, and that define a well-documented and clearly presented study. Generally accepted research standards establish that a quality study follows its study plan, explains and documents deviations from the study plan, addresses study objectives, and presents study results in a clear manner. During the process of identifying relevant generally accepted research standards, we noted that not all studies are conducted the same way. For example, while all studies use data, not all use baseline data. Likewise, all studies require analyses, but not all use models or simulation to conduct analyses. For our analysis of the MCRS-16, we reviewed the unclassified executive summary and the classified report of the MCRS-16, the study's terms of reference, and study plan. We used appropriate, relevant generally accepted research standards in this review of the MCRS-16 to assess as many aspects of the MCRS-16 as possible. We limited our report to the extent to which the MCRS-16 met its five study objectives. Specifically, we applied sections I, II, IV, V, and VIII shown in table 1 below.

Additionally, we reviewed research literature and DOD guidance and identified frequently occurring, generally accepted research standards that are characteristic of a quality study and that are relevant for defense studies such as the MCRS-16. A number of sources were available, and the following were our sources for these standards:

- GAO, *Government Auditing Standards: 2007 Revision*, [GAO-07-731G](#) (Washington, D.C.: July 2007);
- GAO, *Designing Evaluations*, [GAO/PEMD-10.1.4](#) (Washington, D.C.: May 1991);
- RAND Corporation, *RAND Standards for High-Quality Research and Analysis* (Santa Monica, Calif., January 2010);
- U.S. Air Force, Office of Aerospace Studies, *Analyst's Handbook: On Understanding the Nature of Analysis* (Kirtland Air Force Base: January 2000);
- U.S. Air Force, Office of Aerospace Studies, *Air Force Analysis Handbook, A Guide for Performing Analysis Studies: For Analysis of Alternatives or Functional Solution Analysis* (Kirtland Air Force Base: July 2004);
- DOD Instruction 5000.61, *DOD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)* (December 2009);

- DOD Directive 8260.1, *Data Collection, Development, and Management in Support of Strategic Analysis* (January 2007); and
- DOD Instruction 8260.2, *Implementation of Data Collection, Development, and Management for Strategic Analyses* (Jan. 21, 2003).

We applied the research standards in the above documents that we identified as relevant to the MCRS-16, as shown in table 1.

Table 1: Generally Accepted Research Standards Relevant to MCRS-16 Requirements

Design: The study is well designed	
I.	Study plan, scope, and objectives follow formal guidance?
I.a	Does the study plan address specified guidance?
I.b	Was the study plan followed?
I.c	Were deviations from the study plan explained and documented?
I.d	Was the study plan updated over the course of the study and were the updates explicitly identified in the study and updated study plan?
II	Assumptions and constraints are reasonable and consistent
II.a	Are assumptions and constraints explicitly identified?
II.a.1	Are the study assumptions necessary and reasonable?
II.b	Do the study assumptions support a sound analysis?
II.c	Are the assumptions used in analyses common throughout the study and models?
II.d	Do the assumptions contribute to an objective and balanced research effort?
III	Scenarios and threats are reasonable
III.a.	Are scenarios traceable back to formal guidance?
III.b.	Do scenarios represent a reasonably complete range of conditions?
III.c.	Were the threats varied to allow for the conduct of sensitivity analysis?
Execution: The study is well executed	
IV	Methodology is successfully executed
IV.a	Was the study methodology executed consistent with the (MCRS-16) study plan and schedule?
IV.b	Does the methodology support accomplishing the objectives presented in the study plan?
IV.c	Were the models used to support the analyses adequate for their intended purpose?
IV.d	Were the model input data properly generated to support the methodology?
V	(Analytical) Baseline data and other data used to support study and analyses validated, verified, and approved
V.a	Is the (analytical) baseline fully and completely identified and used consistently throughout the study for the various analyses?
V.b	Were data limitations identified and was the impact of the limitations fully explained?
V.c	Were the baseline data verified and validated?

V.d	Was the data verification and validation process documented?
VI	Models, simulations, and verification, validation, and accreditation (VV&A) are reasonable
VI.a	Was a VV&A report that addresses the models and data certification signed by the study director and included in the report?
VI.b	Were modeling and simulation limitations identified and explained?
VI.c	Has each model in the study been described?
VI.d	Are the model processes clearly explained, documented, and understood?
VII	Measures of effectiveness (MOE) and essential elements of analysis (EEA) are addressed
VII.a	Do MOEs adhere to the guidance in the study terms of reference?
VII.b	Are the MOEs fully addressed in the study?
VII.c	Are the EEAs addressed in the study?
Presentation of results: Timely, complete, accurate, concise, and relevant to the client and stakeholders	
VIII	Presentation of results supports findings
VIII.a	Does the report address the objectives?
VIII.b	Does the report present an assessment that is well documented and conclusions that are supported by the analyses?
VIII.c	Are conclusions sound and complete?
VIII.d	Are recommendations supported by analyses?
VIII.e	Is a realistic range of options provided?
VIII.f	Are the study results presented in the report in a clear manner?
VIII.g	Are study participants/stakeholders (i.e., services and combatant commands) informed of the study results and recommendations?

Source: GAO analysis of industry and DOD study and research standards.

We used these relevant standards as our criteria to assess the reported MCRS-16 results. All eight key areas of the study process were considered to have equal importance. However, not all eight areas could be observed based on the information presented in the MCRS-16 report. Three analysts independently reviewed evidence relevant to each subquestion in each of the eight areas, including the study itself, the study Terms of Reference, and the MCRS-16 Study Plan. For each of the subquestions of the study process, the analysts determined whether (1) the evidence had no limitations or raised no concerns, (2) the evidence had some limitations or raised some concerns, (3) the evidence had significant limitations or raised significant

concerns, or (4) we could not determine the extent of limitations or concerns because there was not sufficient information. The analysts then met, compared, and discussed their individual assessments, and reached an overall assessment for each subquestion. For any of the subquestions of the study process for which we determined there were either “some” or “significant” limitations or concerns, we concluded that these aspects of the study were not consistent with the relevant generally accepted research standards.

We conducted this performance audit from March 2010 to December 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Enclosure III



COST ASSESSMENT AND
PROGRAM EVALUATION

OFFICE OF THE SECRETARY OF DEFENSE
1800 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-1800

OCT 28 2010

Mr. William Solis
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Mr. Solis,

The Department of Defense non-concurs with the GAO draft report, GAO-11-82R, "DEFENSE TRANSPORTATION: Additional Information is Needed for DoD's Mobility Capabilities and Requirements Study 2016 (MCRS) to Fully Address All of Its Study Objectives, dated October 4, 2010 (GAO Code 351477). DoD's responses to the report's recommendations are enclosed.

The draft report erroneously asserts that the MCRS did not address three of its five objectives. Specifically, the draft report states that the MCRS failed to identify gaps and overlaps in the mobility system; did not include a risk assessment; and did not provide insights and recommendations. This finding demonstrates a fundamental lack of understanding, and consequently a misrepresentation of the MCRS, despite the significant efforts on the part of the study team to inform GAO's assessment.

The Department stands behind the adequacy, completeness, and utility of the MCRS. The study did in fact address all five of its objectives, and its findings and recommendations have been used to inform the recent Quadrennial Defense Review and senior leader deliberations undertaken as part of the Planning, Programming, Budgeting and Execution process. The MCRS study leadership remains available to assist your team in clarifying and correcting the draft report.

Scott A. Comes
Deputy Director
Program Evaluation

Enclosures:
As stated

**GAO DRAFT REPORT DATED OCTOBER 4, 2010
GAO-11-82R (GAO CODE 351477)**

**“DEFENSE TRANSPORTATION: ADDITIONAL INFORMATION IS
NEEDED FOR DOD’S MOBILITY CAPABILITIES AND
REQUIREMENTS STUDY 2016 TO FULLY ADDRESS ALL OF ITS
STUDY OBJECTIVES”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS**

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to explicitly identify the shortfalls and excesses in the mobility systems that DoD analyzed for the Mobility Capabilities and Requirements Study 2016 (MCRS-16).

DoD RESPONSE: DoD nonconcur. The MCRS explicitly identifies shortfalls and excesses in the mobility system. For example, the MCRS states that “the Department’s strategic airlift fleet exceeds the peak demand in each of the MCRS cases.” The MCRS goes on to quantify the excess as 3.2 million ton-miles per day (MTM/D) in the most demanding MCRS case. Despite this explicit language in the MCRS report, the GAO states that “we found the report ambiguous in describing whether there is excess capability regarding the strategic airlift fleet of C-17 and C-5 aircraft.” The MCRS findings are clear and were used by the Air Force to develop the FY11 President’s Budget, recommending retirement of 22 C-5A aircraft.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to provide a risk assessment for the identified potential shortfalls and excesses.

DoD RESPONSE: DoD nonconcur. The GAO report states “DoD officials told us the main metric used in the MCRS-16 was whether the U.S. prevailed in a conflict. However, this metric does not measure the risk associated with mobility systems.” The draft report is incorrect. The MCRS includes a risk assessment which links the ability of the mobility system to support force closure with a comprehensive set of campaign risk metrics. Risk was assessed based on the ability of U.S. forces to achieve specific campaign objectives. Achieving campaign objectives is directly related to the performance of the mobility system,

because campaign objectives cannot be met if the mobility system cannot deliver required forces in accordance with the required timelines.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to recommend mitigation strategies and any needed changes in force structure and planned investments resulting from the identified potential shortfalls and excesses in the MCRS-16 or explain why mitigation is not necessary.

DoD RESPONSE: DoD nonconcur. Determining changes to force structure, planned investments, and mitigation strategies is beyond the scope of the MCRS. The study provides a range of capability requirements based on its assessment of different potential demands. The Department will continue to use studies like the MCRS to inform decisions related to force structure and planned investments.

RECOMMENDATION 4: The GAO recommends that the Secretary of Defense direct the Office of the Secretary of Defense Cost Assessment and Program Evaluation and U.S. Transportation Command to provide this additional analysis to the Office of the Secretary of Defense and senior decision makers in DoD and in Congress for their use in further deliberations on mobility capabilities and requirements.

DoD RESPONSE: DoD nonconcur. The MCRS met the needs of the Department's senior leaders by providing insights needed to assess future capability requirements. The Department will continue to use studies like the MCRS to inform decisions made as part of the Planning, Programming, Budgeting and Execution process.

GAO DRAFT REPORT DATED OCTOBER 4, 2010
GAO-11-82R (GAO CODE 351477)

**“DEFENSE TRANSPORTATION: ADDITIONAL INFORMATION IS
NEEDED FOR DOD’S MOBILITY CAPABILITIES AND
REQUIREMENTS STUDY 2016 TO FULLY ADDRESS ALL OF ITS
STUDY OBJECTIVES”**

DEPARTMENT OF DEFENSE TECHNICAL COMMENTS

1. Page 4, 1st Summary bullet: “However, it is unclear whether there is sufficient C-130 capacity if there are insufficient crews.”

See Comment 1.

Response: The MCRS clearly states that there is sufficient C-130 aircraft capacity. The MCRS also states “based on current total force planning objectives, the C-130 crew force structure cannot sustain steady state operations in combination with a long duration irregular warfare campaign.” This does not mean there are “insufficient crews,” rather it means that there are not enough crews available given current guidance on dwell to deploy ratios. The MCRS recommended further study in the area of crew ratio and active/reserve crew mix for C-130s to address this finding. There is no discussion in the MCRS report of an insufficient number of C-130 crews. [This response also applies to page 9, 2nd paragraph and MCRS Report page 6, “C-130 Crew Issues.”]

2. Page 6, 2nd Background paragraph: “The MCRS-16 used forces listed in the 2009 President’s Budget with appropriate Fiscal Year 2010 adjustments and compared these capabilities with the requirements for the 2010-2016 timeframe.”

See Comment 2.

Response: Incorrect. The MCRS focused on the 2016 timeframe, not the 2010-2016.

3. Page 14, 1nd paragraph: “However, the study does not provide the insight that retirement of aircraft and lowered military (cargo) aircraft demand is made possible by an increase usage of CRAF civilian cargo aircraft of 4.9 million-ton-miles per day.”

See Comment 3.

Response: False. The cause and effect relationship drawn by GAO between CRAF and military aircraft is illogical given the Department’s policy to move bulk cargo and passengers by CRAF when possible because of its cost effectiveness. Increased use of CRAF over previous studies was driven by an

increased demand for bulk cargo and passenger movements. The MCRS noted that “CRAF cargo capacity is significant, and greatly exceeds the requirements for all MCRS cases.” The requirement for military inter-theater aircraft is driven by the requirement to move over and outsized equipment, which is ill-suited for CRAF. The MCRS noted “the Department’s strategic airlift fleet exceeds the peak demand in each of the MCRS cases.”

4. MCRS Report Page 2, Intra-theater Airlift: “However, the availability of C-17s used in intra-theater missions is conditionally based on assumptions not explicitly stated in the report.”

See Comment 4.

Response: False. The availability of C-17s to be used in intra-theater missions was not based on assumptions, it was based on detailed mobility modeling. C-17s not required for inter-theater airlift missions were made available for intra-theater missions.

5. MCRS Report Page 7, Aerial Refueling Inventory: MCRS-16 objectives required providing a risk assessment, but we found—and DOD officials confirmed—that a risk assessment for tanker inventory was not included in the report.”

See Comment 5.

Response: False. DoD officials involved in the GAO investigation do not recall confirming this incorrect assertion. The MCRS included a risk assessment for aerial refueling and other mobility areas.

6. Page 9, Definition of Terms, Roll-on/Roll-off ships.

See Comment 6.

Response: This definition appears to allude to Large Medium Speed Roll-on/roll-off ships (LMSRs) and is inaccurate. LMSRs are a subset of the Department’s roll-on/roll-off ships (ROROs). ROROs have varying capabilities and are designed to carry rolling stock and can be loaded and unloaded by driving on and driving off.

GAO'S RESPONSES TO DOD'S TECHNICAL COMMENTS

1. Page 4, 1st Summary bullet: "However, it is unclear whether there is sufficient C-130 capacity if there are insufficient crews."

DOD Response: The MCRS clearly states that there is sufficient C-130 aircraft capacity. The MCRS also states "based on current total force planning objectives, the C-130 crew force structure cannot sustain steady state operations in combination with a long duration irregular warfare campaign." This does not mean there are "insufficient crews," rather it means that there are not enough crews available given current guidance on dwell to deploy ratios. The MCRS recommended further study in the area of crew ratio and active/reserve crew mix for C-130s to address this finding. There is no discussion in the MCRS report of an insufficient number of C-130 crews. [This response also applies to page 9, 2nd paragraph and MCRS Report page 6, "C-130 Crew Issues."]

GAO Comment 1: DOD's technical comment makes a distinction between "insufficient crew" numbers and "a situation where C-130 crew force structure that cannot sustain steady state operations in combination with a long duration irregular warfare campaign." We found that the MCRS report has, in the same paragraph, seemingly conflicting statements: (1) The programmed fleet of 401 C-130s exceeds the peak demand in each of the three MCRS cases but added that (2) the C-130 crew force structure cannot sustain steady state operations in combination with a long duration irregular warfare campaign. We find that it is difficult to understand how the C-130 force can exceed demands without C-130 crews, except to acknowledge that there are enough aircraft but there are insufficient aircrews. DOD points out that this could be mitigated by a policy change, but the MCRS does not recommend such a change concerning crew ratios between the active and reserves. We conclude that a potential problem exists and that, contrary to DOD's assertion, there is not sufficient C-130 aircraft capacity without required C-130 aircrews.

To address DOD's technical comment, we modified our report to read "it is unclear whether there is sufficient C-130 capacity when, as stated in the report, the C-130 crew force structure cannot sustain steady-state operations in combination with a conflict."

2. Page 6, 2nd Background paragraph: "The MCRS-16 used forces listed in the 2009 President's Budget with appropriate Fiscal Year 2010 adjustments and compared these capabilities with the requirements for the 2010-2016 timeframe."

DOD Response: Incorrect. The MCRS focused on the 2016 timeframe, not the 2010-2016.

GAO Comment 2: To address DOD's technical comment, we modified our report to reflect the correct timeframe.

3. Page 14, 1nd paragraph: “However, the study does not provide the insight that retirement of aircraft and lowered military (cargo) aircraft demand is made possible by an increase usage of CRAF civilian cargo aircraft of 4.9 million-ton-miles per day.”

DOD Response: False. The cause and effect relationship drawn by GAO between CRAF and military aircraft is illogical given the Department’s policy to move bulk cargo and passengers by CRAF when possible because of its cost effectiveness. Increased use of CRAF over previous studies was driven by an increased demand for bulk cargo and passenger movements. The MCRS noted that “CRAF cargo capacity is significant, and greatly exceeds the requirements for all MCRS cases.” The requirement for military inter-theater aircraft is driven by the requirement to move over and outsized equipment, which is ill-suited for CRAF. The MCRS noted “the Department’s strategic airlift fleet exceeds the peak demand in each of the MCRS cases.”

GAO Comment 3: We believe that there is a relationship between the number of organic aircraft and the amount of CRAF needed. However, this was not the point of the GAO statement cited above. Our point is that the report does not provide the following insight: While the MCRS found that demand for organic aircraft is such that organic aircraft can be retired, the need for CRAF was substantially increased. In DOD’s technical comments, the increased demand for CRAF is not disputed and DOD does not assert that this insight was provided.

To address DOD’s technical comment, we modified our report to read “However, the study does not provide the insight that usage of CRAF civilian cargo aircraft increased by 4.9 million-ton-miles per day.”

4. MCRS Report Page 2, Intra-theater Airlift: “However, the availability of C-17s used in intra-theater missions is conditionally based on assumptions not explicitly stated in the report.”

DOD Response: False. The availability of C-17s to be used in intra-theater missions was not based on assumptions, it was based on detailed mobility modeling. C-17s not required for inter-theater airlift missions were made available for intra-theater missions.

GAO Comment 4: We believe that DOD’s technical comment is incomplete. It correctly states that availability of C-17 aircraft for the intratheater mission is based on mobility modeling, but fails to note that this modeling is premised on critical assumptions about separation times between the start of overlapping conflicts. These separation times, which, according to the study leaders, were used in modeling, are the reason that C-17s available for the intra-theater mission. We believe that decision makers could be better informed if the assumptions about separation times and their role in the MCRS were explicitly stated in the report.

To address DOD’s technical comment, we modified our report to read “However, the availability of C-17s used in intratheater missions is conditionally based on

assumptions used in modeling that are not explicitly stated in the report. For example, a modeling assumption concerning the amount of time between the start of conflicts may free C-17s for the intratheater mission and this information could be useful as decision makers consider the number of C-17s required.”

5. MCRS Report Page 7, Aerial Refueling Inventory: “MCRS-16 objectives required providing a risk assessment, but we found—and DOD officials confirmed—that a risk assessment for tanker inventory was not included in the report.”

DOD Response: False. DOD officials involved in the GAO investigation do not recall confirming this incorrect assertion. The MCRS included a risk assessment for aerial refueling and other mobility areas.

GAO Comment 5: We disagree with DOD’s technical comment. DOD officials confirmed in interviews that risk was considered by use of campaign metrics and whether the U.S. objectives were met in a scenario. The MCRS Executive Summary makes only two allusions to risk. The first allusion is to risk as it pertains to study scope. The second is as follows: “The study assessed the mobility system’s performance by examining how force closures supported achievement of U.S. campaign objectives. This was done by assessing required delivery timelines and a comprehensive set of campaign risk metrics to determine whether available forces met war fight objectives within desired timelines.” There is no other mention of mobility systems risk in the unclassified Executive Summary; consequently, we raised the issue in an on-the record interview setting and documented DOD views concerning the issue. The DOD technical comment is particularly difficult to understand since it refers to Air Refueling which was 120 per cent oversubscribed – without any explanation as to the risk of having demand exceed capacity by 20 per cent in combat scenarios. Presumably, this is an example where risk would be discussed in some detail if mobility systems risk was discussed in this mobility study, but there was no such discussion. Most recently, in the Mobility Capabilities Study 2005, mobility systems were categorized by associated risk. This risk assessment was not done in the MCRS and no specific risk was reported for any mobility system.

6. Page 9, Definition of Terms, Roll-on/Roll-off ships.

DOD Response: This definition appears to allude to Large Medium Speed Roll-on/roll-off ships (LMSRs) and is inaccurate. LMSRs are a subset of the Department’s roll-on/roll-off ships (ROROs). ROROs have varying capabilities and are designed to carry rolling stock and can be loaded and unloaded by driving on and driving off.

GAO Comment 6: We have modified our report to reflect the appropriate definition.

(351477)

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