**Kansas City International Airport Terminal**

**Single Terminal Design Selection Final Report**

****

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# Chapter 1 – Introduction

## Purpose.

The Armored Multi-Purpose Vehicle (AMPV) Analysis of Alternatives (AoA) identified candidates to replace the M113 family of vehicles (FoV) in the armored brigade combat team (ABCT). The analysis was conducted in three phases. Phase I focused on screening analysis to identify alternatives for the AoA. In Phase II, operational and performance analyses informed the draft AMPV Capabilities Development Document (CDD) mobility and force protection requirements for each mission role. Phase III identified the risks for each alternative as well as the sustainment and cost impacts for mixed fleets.

## Background.

The M113 FoV entered U.S. Army service in 1960. As **Error! Reference source not found.** shows, the M113 FoV accounts for roughly one-third of the tracked vehicles in an ABCT. The vehicles support the general purpose (GP), medical evacuation (ME), mortar carrier (MC), mission command (MCmd), and medical treatment (MT) mission roles.



Figure . We’ve got some history.

The asymmetric threat of Operation Iraqi Freedom exposed the force protection gaps of the M113 FoV, resulting in restricted usage outside of forward operating bases. Recognizing this, the Army canceled the M113 program in 2007. The 2008 Army Combat and Tactical Vehicle Strategy study assessed M113 replacement options and recommended a mix of Stryker and Bradley vehicles. In 2009, the Department of Defense (DOD) directed the Army to reassess its

## Problem.

* + What is the problem we are helping to solve. When did we decide what the problem actually was?
  + What type of problem was it, and why was it worth the time of studying/analyzing?
  + Discuss **Defining Goals and Objectives**
  + Did we have multiple objectives? Did we weigh them? Why/Why not? Justify our decision to move forward w/ or w/o

## Stakeholders.

Who is important and why.

The selection committee is made up of six voting members including:

* Troy Schulte, City Manager
* Jolie Justus, City Council, Airport Committee Chairperson
* Jermaine Reed, City Council, Transportation & Infrastructure Chairperson
* Pat Klein, Aviation Director
* John Green, Aviation Department, Chief Financial Officer
* Phil Muncy, Deputy Director of Aviation for Planning and Engineering

The local community matters…. So does the FAA, who else? Why?

## Airport Selection Committee Goals.

From our slides. Objective: Select a design for the new “terminal that enhances the role of Kansas City in providing a high level of air service, as well as a source of community pride for Kansas City and the region.”

## Objective and Decision Criteria.

Overall problem and objective

## Importance Weights

Decision weights

The process of what and who was most important, ect…

# Chapter 2 – Methodology

## Constraints, Limitations, and Assumptions.

The overarching constraints, limitations, and assumptions (CLAs) for the AoA follow. The CLAs for each subordinate analysis are in its respective appendix.

#### *Constraints*[[1]](#footnote-1)*.*

* Final results supported an OSD Study Advisory Group (SAG) in May 2012.
* Study considered M113 FoV mission roles in an ABCT.
* Study considered mixes of vehicles with one new start program.

#### *Limitations*[[2]](#footnote-2)*.*

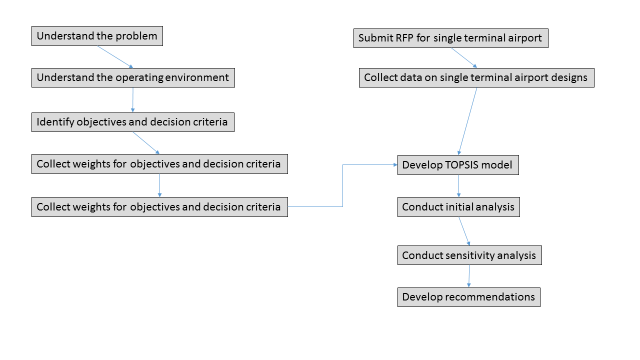
* Existing combat model results were used to assess mission role likelihood of encountering threat; new dynamic modeling was not conducted.
* Cost and sustainment analysis considered current Army force structure.

#### *Assumptions*[[3]](#footnote-3)*.*

* A seminar wargame using defense planning scenarios (DPSs) was sufficient for assessing threat distribution and consistent with combat modeling results.
* The MTVL +FP government concept vehicle data provided a suitable representation of foreign vehicle characteristics and was adequate for performance analyses.
* New military construction was not required for AMPV and not contained in AoA LCCEs.
* LCCE point estimates, based on historical data, were suitable for cost comparisons across mixes as they represented a most likely estimate.
* SDVH and CMTV contract logistics support would be converted to military support before fielding in an ABCT.

## Methodology.

The study team began the screening by identifying a preliminary set of candidate vehicles. The team collected vehicle characteristics from prior analyses, the Worldwide Equipment Guide, the National Ground Intelligence Center (NGIC), the Pentagon Library, the Tank and Automotive Command (TACOM) and open source data. All candidates were evaluated against the screening criteria in **Error! Reference source not found.**. The criteria included four categories: MEP suitability, rough-order-of-magnitude (ROM) average procurement unit cost (APUC) or recapitalization, and an initial performance analysis that compared mobility and force protection attributes of the candidates against the base M113 FoV.

Figure . Methodology.

We did some stuff.

# Chapter 3 – Alternatives

Industry responded to the RFP by providing four responses. Show images of the four options and the data.

Contractors were asked to submit terminal design proposals that met the following specifications:

* + 750,000 square foot single terminal facility
  + 35 “Airport Design Group” III compliant gates
  + Expansion potential
  + 6,500 space, multi-level parking structure adjacent to terminal
  + Two-level terminal
  + Separate commercial and passenger curb areas
  + Estimated annual repayment of $69.33 million (FY22 dollars)
  + Total construction cost Not To Exceed $975M (FY15 dollars)

Contractors submitted four terminal design alternatives:

* + Two designs met specifications.
  + Two designs did not meet specifications but provide reduced capital and operating expenses based on analysis of “opening day” need.
  + We retained all four options, as each of them met at least one or more of the major criteria.

## Alternative 1 Description.

* + Provide an overview, an image and a simple description. What did we decide on as alternatives initially? (Proposals)
  + What are some of the clear differences between alternatives that make them not compensatory?
  + How did that progress as more data was discovered?
  + What was the final composition of alternatives? Discuss the transformation over time.
  + Do the alternatives overlap in any criteria? If so, what areas? Does this offset certain alternatives initially?
  + \*\* Include a small table with the different alternatives and their origin sources \*\*



Figure . Alternative 1 drawing.

## Alternative 2 Description.

Provide an overview, an image and a simple description.



Figure . Alternative 2 drawing.

## Alternative 3 Description.

Provide an overview, an image and a simple description.



Figure . Alternative 3 drawing.

## Alternative 4 Description.

Provide an overview, an image and a simple description.



Figure . Alternative 4 drawing.

## Data Collection.

* + The overall process of defining/finding the data available
    - Proposals; where, who, how many, and why they work so well for data
  + Reliable objective sources
  + Reliable alternative sources

\*\* Include a small table composed of the sources / Include in the references \*\*

Provide the raw data here.

Table . Alternative raw data.

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Discriminating Characteristics** | | **Methodology/Retention Criteria** |
| **MEP Suitability** | * Production year (foreign) * Favorable trade agreement (foreign) * Support M113 mission role: | | * Currently in production (foreign) * Country with favorable trade relations (foreign) * Rear door ingress/egress * Main gun < 105mm * Able to support mission role MEP * Mission-critical characteristics at least to that of M113 FoV variant |
| * Entry method * Main gun caliber * Cargo volume | * Cargo length/height * Electric power production * Wheel firing load |
| **Cost** | * APUC or recapitalization cost | | * APUC or recapitalization cost < $3.2M |
| **Force Protection** | * Ballistic * Artillery * Explosively formed penetrator (EFP) side * Rocket propelled grenade (RPG) | * Anti-tank guided munitions (ATGM) * Tank-fired munitions * Underbody improvised explosive device (IED) | * Subject matter expert rated candidate’s protection for each threat class based on previous analyses, testing or Standardization Agreement (STANAG) levels. * Candidates compared to M113 protection levels using scale: much better (5), better (4), same (3), worse (2), and much worse (1) than M113A3. * Retain candidates that have an average score across all criteria > 3. |
| **Mobility** | * Turning diameter * Vehicle width * Ground clearance | * Ground pressure * Gap crossing * Power-to-weight ratio | * Subject matter experts determined vehicle characteristics based on actual measurements, open source data, or analogous systems. * Candidates compared with M113 for each metric using scale: much better (5), better (4), same (3), worse (2), and much worse (1) than M113A3. * Retain candidates that have an average score across all criteria > 3. |

# Chapter 4 – Model Development

## Objectives and Decision Criteria.

How they were developed, what they are.

## Importance Weights.

How they were developed, what they are.

Table . Importance Weights (placeholder).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sub-Objectives and Definitions** | **Troy**  **Schulte** | **Jolie**  **Justus** | **Jermaine**  **Reed** | **Pat**  **Klein** | **John**  **Green** | **Phil Muncy** | **Overall Weight** | **Rank** |
| **Terminal interior.** | 0.25 | 0.35 | 0.3 | 0.2 | 0.15 | 0.3 | **0.258** | **1** |
| **Air operations throughput.** | 0.15 | 0.3 | 0.05 | 0.35 | 0.15 | 0.3 | **0.217** | **2** |
| **Regional and landside access.** | 0.15 | 0.1 | 0.3 | 0.1 | 0.1 | 0.2 | **0.158** | **5** |
| **Airport revenue.** | 0.3 | 0.15 | 0.1 | 0.15 | 0.3 | 0.1 | **0.183** | **3** |
| **Contractor feasibility.** | 0.15 | 0.1 | 0.25 | 0.2 | 0.3 | 0.1 | **0.183** | **3** |

## TOPSIS Model.

Description of TOPSIS. Why it is a good choice for this problem. How we applied it here.

Provide discussion about

* Metrics & Measures
  + What metrics define which measures? (1-many; under the definition as a metric encapsulating measures, i.e., a label to define a measures category)
  + Which measures scale which attributes? (1-1)
  + Describe how the scales are reliable and directly correlate and provide objective assessment toward goals/objectives
* Weighting Architecture
  + How was precedence given to each weight? Was this decided at random?
  + Do the weights play a significant role in the output?
  + Consider discussing **Group Decision Making Methods** used for this (Potentially **Borda, NGT**, maybe SPAN or Delphi I don’t remember).
* Putting It All Together
  + Construct a **Hierarchical Decision Criteria Tree**
  + \*\* Insert a decision matrix \*\*
  + \*\* Insert technique and results \*\*

# Chapter 5 – Initial Results

Discuss initial results.

## LCCE.

The AMPV AoA cost estimates were based on a 20-year life cycle with a mid-life overhaul, and costs for pure fleets were based on fielding two brigades per year. Historical data from Army databases were used to develop LCCEs. Acquisition cost references for the M2A3 -T and the MTVL +FP included data from the federal logistics (FEDLOG) database such as prices, contracts, historical experience with M2A3 and M113A3 upgrades, and foreign input for MTVL +FP. Existing contract data were used for SDVH and CMTV. Consumables and reparables were based on operating and support management information system (OSMIS) data for military common parts and the contract data requirements list (CDRL)/integrated logistics support center (ILSC) for manufacturer specific parts. **Error! Reference source not found.** depicts the 20-year LCCE for each mix, in base year (BY) 2013 dollars, decomposed into military personnel (MILPERS), research, development, testing, and evaluation (RDT&E), procurement, and operations and maintenance (O&M).



**$15.7**

**$25.8**

**$24.3**

**$26.0**

**$24.9**

**$25.1**

**$24.0**

Figure . LCCE by Alternative.

The LCCEs were similar for all mixes, with a $2 billion difference between the highest and the lowest over the 20-year life cycle (except the base case, which represents sustainment costs only). Procurement is the cost driver for the LCCE. The study team assumed that M2A3 -T procurement occurred in three steps: 1) upgrading 1,131 M2A2/Operation Desert Storm (ODS); 2) upgrading 1,122 M2A1/A0; and, 3) procuring 945 new M2A3 -T. The average cost to upgrade the existing Bradley hulls and to produce new hulls was less than the cost to upgrade an M113A3 to an MTVL +FP. A mixed fleet with the CMTV resulted in the lowest overall procurement cost. Although procurement was the cost driver, O&M costs had the greatest variability at $1.3 billion. A detailed graph of the O&M cost drivers is shown in **Error! Reference source not found.** broken out by systems engineering and program management (SEPM), training, overhaul, system specific base OPs, and consumables and reparables. Note that fuel costs associated with training are captured in other O&M.

# Chapter 6 – Sensitivity Analysis

This chapter discusses the sensitivity analysis… what we looked at and the results.

## Decision Criteria Weights.

Describe the sensitivity analysis conducted on the weights..

Table . TOPSIS Model with New Weights.

|  |  |  |
| --- | --- | --- |
| **Likelihood Level** | **Probability of Maturity by MS C** | |
| 1 | Not likely | ~ 10 percent |
| 2 | Low likelihood | ~30 percent |
| 3 | Likely | ~50 percent |
| 4 | Highly likely | ~70 percent |
| 5 | Near certainty | ~90 percent |

Show the results for each test.

## Alternative Performance.

Discuss sensitivity analysis on some of the performance criteria.

Table . Alternative Performance Sensitivities Considered.

|  |  |  |
| --- | --- | --- |
| **Critical Technology Element** | **Vehicle Risk Level**  **(Likelihood, Consequence)** | |
| **M2A3 -T** | **MTVL +FP** |
| Power generation | schedule: (3,4)  ***600-amp alternator*** | performance: (3,4)  schedule: (3,3)  ***APU*** |
| Powertrain | performance: (3,4)  schedule: (3,4) | N/A |
| HVAC | schedule: (3,2) | schedule: (3,2) |
| External fuel tanks | schedule: (2,3) | schedule: (2,3) |
| Blast resistant seating | schedule: (1,1) | schedule: (2,1) |

Discussion of results here.

## SAW Model.

Discuss the sensitivity analysis using SAW.

Table . SAW Model.

|  |  |  |
| --- | --- | --- |
| **Critical Technology Element** | **Vehicle Risk Level**  **(Likelihood, Consequence)** | |
| **M2A3 -T** | **MTVL +FP** |
| Power generation | schedule: (3,4)  ***600-amp alternator*** | performance: (3,4)  schedule: (3,3)  ***APU*** |
| Powertrain | performance: (3,4)  schedule: (3,4) | N/A |
| HVAC | schedule: (3,2) | schedule: (3,2) |
| External fuel tanks | schedule: (2,3) | schedule: (2,3) |
| Blast resistant seating | schedule: (1,1) | schedule: (2,1) |

Discussion of results here.

# Chapter 7 – Resource Allocation

This chapter summarizes the methods and results for the resource allocation… whatever that is…

# Chapter 8 - Conclusion

This chapter summarizes the results.

## Summary of our findings.

What do we recommend and why?

Resource allocation stuff here?

## Summary of project team lessons.

* The 7 Rules
  + Of the 7 rules mentioned in class, which played significant roles, which were useless, and which would you consider the most important?

Any lessons learned from the project?

### Study References

AMPV AoA Technical Risk Assessment, TARDEC Systems Engineering Group, May 2012.

Armored Multi-Purpose Vehicle Systems Book, Army Materiel Systems Analysis Activity, Headquarters Department of the Army, May 2012.

Armored/Heavy Brigade Combat Team Operational Mode Summary/Mission Profile, Maneuver Center of Excellence, December 2009.

Armored/Heavy Brigade Combat Team System Threats Assessment Report, Training and Doctrine Command G-2, April 2010.

B. Sauer et al., Integration Maturity Metrics: Development of an Integration Readiness Level, Stevens Institute of Technology, 2010.

Capability Development Document for Armored Brigade Combat Team Armored Multi-Purpose Vehicle draft version 3.3, Maneuver Center of Excellence, June 2011.

FM 3-09.42 HBCT Fires and Effects Operations, Headquarters Department of the Army, April 2005.

FM 3-20.971 Reconnaissance and Cavalry Troop, Headquarters Department of the Army, August 2009.

FM 3-21.10 The Infantry Rifle Company, Headquarters Department of the Army, July 2006.

FM 3-21.12 The Infantry Weapons Company, Headquarters Department of the Army, July 2008.

FM 3-21.20 The Infantry Battalion, Headquarters Department of the Army, December 2006.

FM 3-22.90 Mortars, Headquarters Department of the Army, December 2007.

FM 3-22.91 Mortar Fire Direction Procedures, Headquarters Department of the Army, July 2008.

FM 3-34.22 Engineer Operations: Brigade Combat Team and Below, Headquarters Department of the Army, February 2009.

### Alternative Vehicle Characteristics

**Purpose.**

This appendix provides an excerpt from the AMPV System Book, 25 May 2012. The AMPV Systems book is a configuration management tool maintained by the Army Materiel Systems Analysis Activity (AMSAA) in coordination with the product managers (PM), the Tank and Automotive Research, Development and Engineering Center (TARDEC) and the Maneuver Center of Excellence (MCoE), to support analytic efforts. The systems book provides a single point of reference for:

* Key technologies and capabilities associated with the vehicles.
* Vehicle concepts developed by TARDEC.
* Selected data references that may assist program participants during the course of development activities.

The systems book does not cover all areas associated with the development and fielding of the various vehicles. The systems book’s primary purpose is to support the AoA, and therefore, it principally covers areas which are specifically modeled in the AoA analysis efforts. The AMSAA System Book dated 25 May 2012 was the authoritative source for vehicle and mission equipment configuration for the AoA. Other data required to support AoA not specifically available in the systems book was obtained from appropriate subject matter experts and will be noted as appropriate throughout the report.

**Background.**

The vehicles selected for potential inclusion in the AMPV AoA were analyzed in two screening analyses (preliminary and mission-focused) to determine the alternatives for the study. The screening analysis considered numerous U.S. and foreign candidates as potential replacements for the M113 family of vehicles (FoVs) in five mission roles: general purpose, medical treatment, medical evacuation, mortar carrier, and mission command.

The systems book provides vehicle characteristics for the following vehicles:

* The M113 FoV.
* TARDEC’s M2A3 turretless (M2A3 -T) Bradley derivative concepts.
* TARDEC’s ACT3071 Mobile Tactical Vehicle Light plus Force Protection (MTVL +FP) derivative concepts (which were an upgrade to the M113 series vehicles).
* The Stryker double-V hull (SDVH) Command Vehicle (CV) & Medical Evacuation Vehicle (MEV).
* The Caiman Multi-Terrain Vehicle (CMTV) mine resistant ambush protected (MRAP) mission command on-the-move (MCOTM) vehicle.

These vehicles are illustrated in Figure B‑1.

|  |  |
| --- | --- |
| M113 Armor | M113A3 FoV (M113A3, M577A3, M1064A3, M1068A3) |
| AMPV_GPV_Concept_(ACT3047)_AoA_Package_Update_(30Sep11) | M2A3 -T Concept (ACT3047, ACT3048, ACT3049, ACT3050, ACT3051) |
| ACT3071 AMPV_GPV_MTVL_FP_AoA_Concept | MTVL +FP Concept (ACT3071) |
| Stryker Med Treatment Concept Master R1 | Stryker double-V hull (XM1254) |
| Photorecord Caiman C2OTM Training Vehicle | CMTV MCOTM |

Figure ‑. Vehicles depicted in the AMPV Systems Book.

Abbreviations, Brevity Codes, and Acronyms

|  |  |
| --- | --- |
| 1SG | first sergeant |
| ABCT | Armored Brigade Combat Team |
| ACAT | acquisition category |
| ACDB | Automated Cost Database |
| ACEIT | Army Cost Estimating Integrated Tool |
| ACL | allowable cabin load |
| ACM | Army concept of operations cost model |
| ACP | army cost position |
| ADP | assured delivery price |
| AMCOS | Army Military-Civilian Cost System |
| AMEDD | Army Medical Department |
| amp | ampere |
| AMPV | Armored Multi-Purpose Vehicle |
| AMSAA | Army Materiel Systems Analysis Activity |
| Ao | operational availability |
| AoA | analysis of alternatives |
| APU | auxiliary power unit |
| APUC | average procurement unit cost |
| ARAT | Abrams reactive armor tiles |
| ARCIC | Army Capabilities Integration Center |
| ARFORGEN | Army force generation |
| ARL | Army Research Lab |
| ARS | armed reconnaissance squadron |
| ASA(ALT) | Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology |
| ASD | Assistant Secretary of Defense |
| AT&L | acquisition, technology, and logistics |
| ATGM | anti-tank guided munitions |
| AUMC | average unit manufacturing cost |
| AWARS | Advanced Warfighting Simulation |
| AXP | ambulance exchange point |
| BAS | battalion aide station |
| BBS | brigade and below scenario |
| BCBL | battle command battle lab |
| BCT | brigade combat team |
| BDE | brigade |
| BES | budget estimate submission |
| BFV | Bradley Fighting Vehicles |
| BN | battalion |
| BOS | business operating system |
| BRAT | Bradley reactive armor tiles |
| BSA | brigade support area |
| BSB | brigade support battalion |
| BSTB | brigade special troops battalion |
| BY | base year |
| C2 | command and control |
| C3T | command, control and communications-tactical |
| CA | civil affairs |
| CAB | combined arms battalion |
| cal | caliber |
| CALL | Center for Army Lessons Learned |
| CAM | combined arms maneuver |
| CAPE | Cost Analysis and Program Evaluation |
| CASEVAC | casualty evacuation |
| CAV | cavalry |
| CBRNE | chemical biological radiological, nuclear, and high-yield explosives |
| CCP | casualty collection point |
| CDD | capability development document |
| CDR | critical design review |
| CDRL | contract data requirements list |
| CDS | corps and division scenario |
| CERDEC | Communications-Electronics Research Development and Engineering Center |
| CES | cost element structure |
| CFE | contractor furnished equipment |
| CFH | Cost Factor Handbook |
| CFV | cavalry fighting vehicle |
| CI | confidence interval |
| CIDNE | Combined Information Data Network Exchange |
| C-IED | counter-improvised explosive device |
| CLA | constraints, limitations, and assumptions |
| CMTV | Caiman Multi-Terrain Vehicle |
| CO | company |
| COA | Course of Action Analysis |
| CONOPS | concept of operations |
| CONUS | continental United States |
| COP | combat outpost |
| COTS | commercial off-the-shelf |
| CP | command post |
| CPAT | capability portfolio analysis tool |
| CS | combat support |
| CSDR | cost and software data reporting |
| CSS | combat service support |
| CTC | Combat Training Center |
| CTCP | Combat Trains Command Post |
| CTE | critical technology element |
| CTV | combat tactical vehicle |
| CV | command vehicle |
| DAB | Defense Acquisition Board |
| DAG | Defense Acquisition Guidebook |
| DAMO-CIA | Department of the Army Military Operations – Capabilities, Integration, and Analysis |
| DAU | Defense Acquisition University |
| DESC | Defense Energy Support Center |
| DF | direct fire |
| DLA-E | Defense Logistics Agency-Energy |
| DM | dynamic maintenance |
| DMIL | demilitarization |
| DOD | Department of Defense |
| DOT&E | Director, Operational Test and Evaluation |
| DOTmLPF | doctrine, organization, training, materiel, leadership and education, personnel, and facilities |
| DPS | defense planning scenario |
| DU | dynamic update |
| DW | data warehouse |
| EAB | echelons above brigade |
| ECP | engineering change proposal |
| EFP | explosively formed penetrator |
| EMD | engineering and manufacturing development |
| EMT | emergency medical treatment |
| ENG | engineer |
| FA | field artillery |
| FAT | first article testing |
| FBCF | fully burdened cost of fuel |
| FCM | Force and Organizational Cost Estimating System cost model |
| FCPM | fuel consumption prediction model |
| FCS | future combat system |
| FDC | fire direction cell |
| FDT | first destination transportation |
| FEDLOG | federal logistics |
| FKSM | Fort Knox Supplemental Manual |
| FLOT | forward line of troops |
| FLVN | Fort Leavenworth |
| FM | field manual |
| FMTS | fleet mix trade space |
| FMTV | family of medium tactical vehicles |
| FOB | forward operating base |
| FoV | family of vehicles |
| FRP | full rate production |
| FSC | forward support company |
| FSR | field service representative |
| FUE | first unit equipped |
| FY | fiscal year |
| FYDP | fiscal year defense program |
| G-3/5/7 | operations and plans |
| GCS | ground combat system |
| GCV | Ground Combat Vehicle |
| GDLS | General Dynamics Land Systems |
| GFE | government furnished equipment |
| GIS | geospatial information system |
| GOTS | government off-the-shelf |
| GP | general purpose |
| GPM2S | Guided Precision Munitions and Mortar Systems |
| HBCT | Heavy Brigade Combat Team |
| HHC | headquarters and headquarters company |
| HQ | headquarters |
| HQDA | Headquarters Department of the Army |
| HVAC | heating, ventilation, and air conditioning |
| IBCT | Infantry Brigade Combat Team |
| ICD | Initial Capability Document |
| IDF | indirect fire |
| IED | improvised explosive device |
| IFV | infantry fighting vehicle |
| ILAP | Integrated Logistics Analysis Program |
| ILSC | Integrated Logistics Support Center |
| IPF | initial production facilities |
| IPR | in-progress review |
| IPT | integrated risk process team |
| IRL | integration readiness levels |
| ISAF | International Security Assistance Force |
| IW | irregular warfare |
| JFAST | Joint Flow Analysis System for Transportation |
| JLI | joint logistics integrator |
| JLTV | Joint Light Tactical Vehicle |
| JROC | Joint requirements oversight council |
| JTF | joint task force |
| JTRS | Joint Tactical Radio System |
| KC | key characteristic |
| km | kilometer |
| KPP | key performance parameters |
| KSA | key system attributes |
| LBC | logistics battle command |
| LCB | lower confidence bound |
| LCC | life cycle cost |
| LCCE | life cycle cost estimate |
| LEE | Fort Lee |
| LFTE | live fire test evaluation |
| LMSR | large, medium speed roll-on |
| LNO | liaison officer |
| LOC | lines of communication |
| LORA | low obliquity reactive armor |
| LRIP | low rate initial production |
| LUH | Light Utility Helicopter |
| M2A3 -T | turretless Bradley |
| MARC | Manpower Requirements Criteria |
| MBT | main battle tank |
| MC | mortar carrier |
| MCmd | mission command |
| MCO | major combat operations |
| MCoE | Maneuver Center of Excellence |
| MCOTM | mission command on the move |
| MDD | materiel development decision |
| ME | medical evacuation |
| MEDCAP | medical civil affairs programs |
| MEDEVAC | medical evacuation |
| MEP | mission equipment package |
| METT-TC | mission, enemy, terrain and weather, troops and support available, time available, civil considerations |
| MEV | medical evacuation vehicle |
| MILCON | military construction |
| MILPERS | military personnel |
| MLS | Multi-Level Scenario |
| mm | millimeter |
| MMH | maintenance man hours |
| MoE | measure of effectiveness |
| MOG | maximum on ground |
| MoP | measure of performance |
| MOS | military occupational specialty |
| MPA | military personnel, Army |
| MR | mission role |
| MRAP | Mine Resistant Ambush Protected |
| MRD | Mounted Requirements Directorate |
| MRL | multiple rocket launcher |
| MS | milestone |
| MSFD | multi service force deployment |
| MSR | main supply route |
| MT | medical treatment |
| MTBEFF | mean time between essential function failure |
| MTBSA | mean time between systems abort |
| MTOE | modified table of organization and equipment |
| MTVL +FP | Mobile Tactical Vehicle Light with add-on armor |
| NATO | North Atlantic Treaty Organization |
| NBCRV | nuclear, biological, and chemical reconnaissance vehicle |
| NDI | non-developmental items |
| NEA | Northeast Asia |
| NEPA | National Environmental Protection Agency |
| NET | new equipment training |
| NG | National Guard |
| NGIC | National Ground Intelligence Center |
| NRMM | NATO Reference Mobility Model |
| NS | new start |
| O&M | operations and maintenance |
| O&S | operating and support |
| ODASA-CE | Office of the Deputy Assistant Secretary of the Army for Cost and Economics |
| ODS | Operation Desert Storm |
| OE | operational environment |
| OEPP | operational energy plans and programs |
| OIF | Operation Iraqi Freedom |
| OMS/MP | Operational Mode Summary/ Mission Profile |
| OOTW | operations other than war |
| OP | operation |
| OPTEMPO | operating tempo |
| ORF | operational readiness float |
| OSD | Office of the Secretary of Defense |
| OSMIS | operating and support management information system |
| OSRAP | optimum stock requirements analysis program |
| OUSD | Office of the Under Secretary of Defense |
| P&A | pay & allowances |
| P&D | production and deployment |
| P&R | personnel and readiness |
| PA&E | program analysis and evaluation |
| PAUC | program acquisition unit cost |
| PB | President's Budget |
| PBS | production base support |
| PD | program director |
| PEO | program executive office |
| PIM | Paladin Integrated Management |
| PM | program manager |
| PO | peacekeeping operations |
| POC-V | Paladin Operation Command Vehicle |
| POE | program office estimate |
| POI | point of injury |
| POL | petroleum, oils, and lubricants |
| POM | program objective memorandum |
| PPB | planning, programming, budgeting |
| PSI | pounds per square inch |
| PVT | product verification testing |
| QM | quartermaster |
| QRF | quick reaction force |
| R&E | research and engineering |
| RAM-C | reliability, availability, maintainability, and cost rationale |
| RC | Regional Command |
| RDT&E | research, development, testing, and evaluation |
| RECON | reconnaissance |
| RFP | request for proposal |
| ROM | rough-order-of-magnitude |
| ROS | reduced operating system |
| RPG | rocket propelled grenade |
| RRAD | Red River Army Depot |
| RSTA | reconnaissance, surveillance, and target acquisition |
| RTD | return to duty |
| SAG | study advisory group |
| SAIC | Science Applications International Corporation |
| SBCT | Stryker Brigade Combat Team |
| SCT | scout |
| SDDC | Surface Deployment and Distribution Command |
| SDT | second destination transportation |
| SDVH | Stryker double-V hull |
| SEPM | system engineering program management |
| SIGACT | significant activity |
| SLAD | Survivability and Lethality Directorate |
| SME | subject matter expert |
| SoSAM | System of Systems Availability Model |
| SPOD | seaport of debarkation |
| SPOE | seaport of embarkation |
| SQDRN | squadron |
| SRC | standard requirements code |
| SRDDM | Schedule Risk Data Decision Methodology |
| SSA | support to strategic analysis |
| SSA | support to strategic analysis |
| SSTS | sustainment systems technical support |
| STANAG | Standardization Agreement |
| STAR | System Threat Assessment Report |
| STE | system test and evaluation |
| STONS | short tons |
| STS | system test support |
| SWA | Southwest Asia |
| SWG | seminar wargame |
| TAC | tactical command |
| TACOM | Tank and Automotive Command |
| TARDEC | Tank Automotive Research, Development and Engineering Center |
| TARGET | Transportability Analysis Reports Generator |
| TCM | TRADOC capability manager |
| TDP | technical data package |
| TEA | Transportation Engineering Agency |
| TOC | tactical operation center |
| TOE | table of organization and equipment |
| TRAC | Training and Doctrine Command Analysis Center |
| TRADOC | Training and Doctrine Command |
| TRISA | TRADOC Intelligence Support Activity |
| TRL | technology readiness level |
| TRM | training resource model |
| TSC | theater support command |
| TTP | tactics, techniques, and procedures |
| USAFMSA | United States Army Force Management Support Agency |
| V80 | 80 percent easiest terrain |
| VAM | Vehicle Acceleration Model |
| VCI | vehicle cone index |
| WAS | wide area security |
| WBS | work breakdown structure |
| WD | win decisive |
| WfF | warfighting function |
| WIN-T | Warfighter Information Network - Tactical |
| WSMR | White Sands Missile Range |
| XO | executive officer |

1. Constraint: a restriction imposed by the study sponsor that limits the study team’s options in conducting the study. [↑](#footnote-ref-1)
2. Limitation: an inability of the study team to fully meet the study objectives or fully investigate the study issues. [↑](#footnote-ref-2)
3. Assumption: a statement related to the study that is taken as true in the absence of facts, often to accommodate a limitation. [↑](#footnote-ref-3)