Lessons Learned from Estimating Non-Standard Equipment (NSE)

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Outline

• NSE Background and Studies
• Estimating Challenges
• Conclusions
• Special Thanks and Questions
Introduction to NSE

• Unconventional warfare required the DoD to develop new strategies to support the warfighter
  – DoD purchased Non-Standard Equipment (NSE) to fill technology gaps
  – Tens of billions of dollars invested in lifesaving equipment

Boomerang Gunfire Detection

M160 Mine Clearance Robot

PSS-14 Mine Detector
Characteristics of NSE

• Rapid design and use of Commercial Off-the-Shelf (COTS) systems
• Rapid production and deployment
• Sustainment in theater, often by Original Equipment Manufacturer (OEM) or Contractor Logistics Support (CLS)
• Primary focus on immediate threat, not necessarily cost or configuration
Current State of Wartime NSE

• US operations have ended in Iraq and are drawing down in Afghanistan

• Phase out of Overseas Contingency Operations (OCO) funding, ending in FY16 (or sooner!)
  – Most NSE programs do not have line items in the base budget

• Development of requirements for NSE future is ongoing
  – Assessment of what capabilities should be retained
  – Transition of retained equipment to traditional lifecycle process
  – Or: storage/disposal

• Result: Equipment is returning to CONUS without fully defined guidance

“Requirements and funding are everything”
– Jeff McLean, TACOM ILSC
Case Study 1: Robots

Small Unmanned Ground Vehicle Robots

Vehicle Transportable
- Talon IV

Soldier Portable
- PackBot FasTac
- SUGV 310 Mini-EOD

Ultra-Light
- Dragon Runner

- COTS systems sent to theater for Route Clearance and Explosive Ordnance Disposal (EOD) missions
- Managed by Robotics Systems Joint Project Office (RSJPO)
- 7,000+ systems procured, primarily from Qinetiq and iRobot
- Plan to retain 1,500-2,700 bots in five models as bridge strategy
Case Study 2: **MRAP**

**Mine Resistant Ambush Protected Vehicles**

- Urgent need development/procurement to protect soldiers and convoys in theater from IEDs and attacks
- Joint program purchased over 20,000 vehicles from seven manufacturers in 20 configurations
- Plan to retain 8,585; three models in seven configurations
Relevant Studies

**Robots:** Two related Cost Benefit Analysis (CBA) studies for RSJPO

- CBA 1 focused on storage vs fielding/sustainment: provide potential sustainment plan and funding justification
- CBA 2 focuses on transition of NSE to new organization and resulting sustainment bridge

**MRAP:** Support to PM MRAP for two concurrent tasks

- Cost Analysis Requirements Description (CARD)
- Program Office Estimate (POE) to support affordability analysis
NSE Estimating Challenges

• Programmatic issues
• Configuration and Reset
• Storage
• Sustainment
• Other Elements
NSE Estimating Challenges

• **Programmatic Issues**
• Configuration and Reset
• Storage
• Sustainment
• Other Elements
Program-Specific Details – Robots

• Ground robots still relatively new in DoD
• NSE robots bridging to Program of Record (PoR) replacements
  – No “home” organization without PoRs
  – Requirement for PoRs still being defined/approved
  – Number/mix of NSE bots keeps changing
• Short Economic Useful Life (EUL) (5 or 10 years)
  – Retaining older technology
  – Risk of obsolescence and diminishing manufacturing sources
• Few peacetime analogies available for data sources
Program-Specific Details – MRAP

- MRAP Study III provides plan for retained quantity and fielding
- Retained MRAPs are displacing a select number of vehicles
- Key Leader Vehicle (KLV) configuration filling new requirement as a platform for Army WIN-T
- 30 year EUL after reset/upgrade is complete
- Higher protection levels than many comparables
Full Materiel Release (FMR)

- Army issued policy requiring FMR for all fielded NSE
- Requires type classification, logistics demos, training plans, tech data package, technical manuals, testing

**Robots:**
- CBA 1 included estimate for FMR and potential rationale for proposing waiver
- CBA 2 assumes some FMR activities completed

**MRAP:**
- Tech manuals to be completed (last remaining condition to achieve Full Material Release)
Funding

• As OCO funds expire, MRAP and Robots need to be added to Army base budget

Robots:
  – Funding cannot be provided without a home organization
  – Without precedent and PoRs to bridge to, difficult to find organization to absorb NSE robots
  – Goal of CBA 2 is to provide path to parent organization

MRAP:
  – Goal of ongoing Affordability Estimate is to finalize requirement for 8,585 retained systems and attain base budget funding stream
NSE Estimating Challenges

• Programmatic issues

• Configuration and Reset
  • Storage
  • Sustainment
  • Other Elements
Configuration – Return from OCONUS

• Configuration and equipment condition are not well-tracked in theater

Robots:
  – Many return with missing parts (controllers, arms, tracks, manuals, etc.)
  – 45% Talon IV have outdated lead-acid batteries

MRAP:
  – Disposition of Government Furnished Equipment (GFE) is in question
  – Enduring configurations approved by Vice Chief of Staff of the Army 14 Mar 2013
Configuration – Reset/Upgrade

• After wartime usage, retained NSE requires reset
• OCO funding can be used to cover reset costs (while supplies last)

Robots:
– Annual wartime repair cost actuals used to assume reset; upgrades include power mast
– All robots require new batteries and CONUS radios

MRAP:
– Reset to completely serviceable condition (Army 10/20 + maintenance standards)
– Modifications based on Engineering Change Proposals (ECPs)
Configuration – GFE

Robots:
- GFE usually provided by receiving unit (cameras, accessories, etc.)

MRAP:
- GFE is a significant cost driver
  - “A-Kits” (standard brackets & cables)
  - “I-Kits” (vehicle-unique mounts)
  - “B-Kits” (actual GFE end item)
- Final MRAP configurations are still being refined
- GFE needs to be reset (or purchased) and sustained
- Some GFE items no longer in production
NSE Estimating Challenges

• Programmatic issues
• Configuration and Reset
• **Storage**
• Sustainment
• Other Elements
Storage

• Potential for NSE to be retained in storage
• Care of Supplies in Storage (COSIS) for items in depot float or long-term storage

Robots:

– In CBA 1, explored “cold storage” of all retained robots
– Sierra Army Depot stores non-COSIS items for free after receipt

MRAP:

– 65% of vehicles going into Army Prepositioned Stock (APS) and other storage
– Facility requirements for APS locations TBD
NSE Estimating Challenges

• Programmatic issues
• Configuration & Reset
• Storage
• **Sustainment**
• Other Elements
Sustainment Concept – Robots

• Wartime sustainment reflected extraordinary support
  – Tech/Trainer contractors were stationed with each unit
  – PM-run Joint Robot Repair and Fielding (JRRF) activity
    provided parts, depot-level support, upgrades, and electronics repair

• CBAs to provide guidance on sustainment concepts
  – Retain contractor-based JRRF
  – Convert JRRF to organic
  – Enlist existing depot
  – Utilize maintenance operations at each base
Sustainment Concept – MRAP

• Again, wartime sustainment not reflective of realistic post-war operations
• Plan is to convert to traditional organic support
  – “Green Suit” field level maintenance
  – Depot Level Maintenance at … depots
• Analogies from existing vehicles sufficient for estimates
  – Requires assumptions about COSIS level of stored vehicles
Interim Sustainment

• Sustainment required after fielding while Army finalizes logistics chain

Robots:
– Purpose of CBA 2 is to determine a feasible bridge sustainment until PoRs come online
– Existing JRRF potentially could support, but still requires parent organization

MRAP:
– Interim CLS provided by Field Service Reps (FSRs), often from OEM
– Can only be funded with procurement and must be completed one year after FMR
Sustainment – Initial Parts

- Most initial Authorized Stockage Lists (ASLs) fulfilled using parts on hand
  - Large stocks remain from wartime
  - Can cannibalize parts from non-retained vehicles

Robots:
- Supply chain and parts obsolescence must be captured in risk calculations

MRAP:
- Exception: MATVs need full set of ASLs
- ASLs are required for vehicles going into APS but not other storage
Sustainment – Parts

• Typically use OPTEMPO to estimate parts costs
  – Miles or hours (cost per mile or cost per hour)

• Wartime OPTEMPO not representative of peacetime mission (training)

Robots:
  – Cost per bot per year from JRRF CONUS training/repair at Ft Leonard Wood (not based on OPTEMPO)

MRAP:
  – Can use historical data from similar vehicles until CONUS data is available
  – Still need to generate cost basis
  – Additional challenge: Reserve/National Guard OPTEMPO
NSE Estimating Challenges

- Programmatic issues
- Configuration and Reset
- Storage
- Sustainment
- Other Elements
Training – Robots

• In Theater, Tech/Trainers on-site with units, JRRF provided support & maintenance training

• Now, difficult to find training proponent for NSE robots

  – Need organization to perform New Equipment Training (NET)
  – Very small user base footprint to keep up user and maintainer training
  – Army TRADOC Engineer, EOD & Route Clearance schools provide mission training only
Other Cost Elements

Other elements estimated did not necessarily present NSE-unique challenges or were out of scope

• Selection & Disposal from theater
• Systems Engineering/Program Management
• Manpower
• Special Tools
• Fielding and Transportation
• Software/Post-Deployment Software Support (PDSS)
• Overhaul
• Disposal & Environmental
Conclusions

• Actuals from NSE wartime operations were often not useful for estimating peacetime sustainment
  – DoD should require consistent data collection & oversight for NSE in the future
  – But: alternative methodologies will still be required

• Army small robots provide a particular estimating challenge
  – Lack of precedent
  – Changing requirements
  – Obsolescence issues
  – Funding uncertainty
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QUESTIONS?