Top 10 Executive Site Visit Q&A: Equipment Upgrade/Repair Operational Case defining Simulation Scope

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Key objectives of this Report include outlining flexible & effective equipment upgrade/repair simulation case approach designed to be tailored & affordable for time/cost to support site visit executive implementation of recently updated upgrade/repair policy.

Here we present overall simulation processes, common sets of logistics cost elements, measures of effectiveness & new simulation frameworks alongside factors to consider when assessing & subsequently conducting executive site visit designed to improve operational performance.

Executive site visits to date have shaped an understanding of areas that equipment upgrade/repair capabilities might benefit programme/systems to support go/no go decision making & subsequent site operation improvements utilising justifiable information.

Upgrade/repair simulations are characterised by smart application & integration of appropriate processes, technologies & survey information-based capabilities to improve reliability & operational effectiveness of DoD systems & components.

At its core, upgrade/repair simulations during site visits are based on evidence of requirements provided by operational work order creation alongside other enabling processes & technologies. Equipment upgrade/repair simulations utilise systems engineering approaches to collect survey information, enable detailed assessments & support decision-making processes for system acquisition, operations & sustainment.

In evaluating potential upgrade/repair site capabilities like technologies, work order processes, or information applications, simulations are designed to address these areas in comprehensive & consistent manner, particularly when incremental acquisition or fielding strategy is being considered.

Although the basic concept & purpose of equipment upgrade/repair simulations have generally been addressed by DoD, many interpretations exist regarding assessment of work order capabilities to ensure appropriate & accurate considerations are given to operational capabilities, logistics costs & benefits to mission requirements.

So, what is an upgrade/repair simulation? Requirements for simulations include decision support site visit operations identifying operational alternatives as well as presenting convincing logistics, economic, risk & technical arguments for selection & implementation to achieve stated organisational objectives/imperatives. Simulations do not replace smart judgment of decision makers, but provides for site visit assessments providing uniform foundations upon which sound operational decisions can be made.

The subject of equipment upgrade/repair simulations must include any significant operational decisions being contemplated by site visit executive. For example, Simulations have been designed to substantiate case to acquire new mission-critical systems, but not at the same level as Capabilities Based Assessments, transformation of logistics operations, or establishment of automated training curriculums.

In general, Simulations are designed to answer the following question: What are the likely fiscal & operational consequences if site visit executive decides to execute implementations of improvements in ordering mission decision/action?

The possibility exists that any projected logistics cost reductions identified in simultions could be viewed as an asset available for reallocation in the budgeting process. In evaluating the potential application of equipment upgrade/repair capabilities at work sites, it's important to address desired end states from perspectives of key performance metrics & assumptions impacting logistics operations in system-wide capacities.

Here we outline general approaches to define outcomes desired by DoD for Equipment Upgrade/Repair Simulations, understand/define the problem & detail desired end state. This approach focuses on As-Is system trends, evaluating Measures of Effectiveness, their logistics cost drivers & key performance metrics designed to determine if planned work orders represent viable solutions to mission requirements. If so, site visit executive must determine what work order capabilities are applicable & use this information to define & carry out feasible solutions.

Equipment Upgrade/Repair site visit Scoping Questions provide some general questions and guidance to relate concepts accurately to DoD initiatives. We present example Answers to these questions so work sites are provided with information & new approaches to support upgrade/repair implementation. As you plan your Simulation, our example answers to these questions could assist in framing your general approach/strategy to ensure your Simulation is adequately defined & scoped to address key operational Issues:

1. What contract strategies impacting cost/schedule have effect on projected impacts of system/component level replacement frequency?

Equipment upgrade/repair capability can provide source/capability information to determine projected long-term sustainment estimates mission requirement decisions, work order task frequency, etc. DoD must define scope of Simulation to ensure equipment diagnostic/trending information is used to define assumptions & establish system/component sustainment baseline based on assessments of overall Logistics cost/benefit to operations. DoD must ensure contracts impacting implementation of upgrade/repair capability are considered when defining scope of Simulaton. The impact on/from related equipment contracts should be addressed in risk assessment & condition monitor portion of site visit.

2. What cost, schedule & performance risk is projected based on proposed technology for procurement, implementation & reduction/elimination of sustainment functions/tasks performed in excess of mission requirements?

Equipment Upgrade/Repair Simulations must provide DoD with conclusions/recommendations regarding technology maturity levels & risk associated with adoption technology, including site visit surveys regarding cost, schedule, and performance. Simulations must identify potential functions, tasks, or systems/components to be impacted by upgrade/repair operations. Required level of detail generated by Simulation is based on existing equipment system condition & status of site visit assessment & what operational information is available. To the maximum extent possible, identification of current upgrade/repair capability in terms of functional areas such as equipment condition detection, isolation, prediction, reporting, assessment,decision-support execution & recovery, to be carried out both on & off-board.

3. What collected sourced/limited information on upgrade/repair decision making must be automated to reduce logistics support costs involved in sustainment activities?

DoD must ensure specific logistics processes utilise upgrade/repair site visit tools/capabilities such as trending, diagnostics and/or prognostics are defined & any potential work order tasks, functions & measures of equipment metrics affected by such tools are clearly communicated. Early planning for automated information collection is required & must examine each element/ metrics to source & determine of what factors will be brought to bear on its accuracy. While collection of all elements is beneficial, discriminating response elements must focus of condition metrics planning approach. Good results are best accomplished by engaging site visit operators in discussions as early as possible in acquisition phase of mission-critical equipment. Authoritative source for each information element must be established along with availability determinations created early in Simulation planning process.

4. Does upgrade/repair initiative improve/modify ability to design new or current sustained systems hitting schedule/cost/tech Goals?

DoD must Identify any mission-critical equipment system-specific capability proposed upgrade/repair operations to improve condition of existing system or for projected future increments. Identify specific incremental capabilities & automated external systems interfaces utilised by work site can be designed to enhance functional properties such as connectivity to near real -time/real –time equipment system condition assessments., work order task frequency, etc. Establishment of well-defined scope of the Simulation can be utilised to ensure diagnostic/trending information is used to define assumptions and establish system/component baseline from which overall logistics cost/ benefit can be assessed. Specific appropriate metrics include work order planning, automated Supply line connection Support, installation structure quality & quick transport functions. Logistics cost element structure must ensure that the desired mission requirements & levels of detail are defined & assessed to support proposed upgrade/repair capability. Logistics operational drivers should be clearly defined & will usually vary depending on capability determined during site visit to include sensors, diagnostics, prognostics, etc. useful in defining logistics cost element structure.

5. How will equipment system/subsystem subject to upgrade/repair affect changes to operator/user incremental performance levels for new product solutions to mission requirements?

DoD must Identify known impacts to equipment upgrade/repair capability to ensure appropriate qualitative/quantitative metrics are included to define impacts to system operation & sustainment policy, changes to tactics, techniques & procedures. Planned sustainment strategies must be identified to define how it will fit with the acquisition strategy of equipment system it supports. Upgrade/repair increments must be communicated as clearly as possible during site visit & ensure boundaries/ interfaces with existing logistics, Command & Control, and/or mission-critical systems are adequately described in tight relationship to condition metrics.

6. How will upgrade/repair decision/plans affect integrated operational impact of DoD systems & what capabilities influence sustainment margins/downtime?

When equipment upgrade/repair simulation is focused on specific system/sub-systems or components, DoD must ensure project scope, logistics cost elements & work orders are tailored according to sound, fundamental principles employed during site visits. DoD must utilise existing site visit techniques & historical information, projected mission requirement estimates, any phased upgrade/repair capability increments & planned system/subsystem or component enhancements, wherever possible. DoD must Identify system/sub-system and/or components where projected upgrade/repair capability will have direct/indirect effect on planned modernisation improvements. Simulations must identify specific systems with direct automation or integration requirements to include clearly defined assumptions & timing of supply line connections associated with operational integration. In cases where automation has been fielded, DoD must ensure logistics costs are adequately addressed in assumptions to either include in site visit assessments or if they are unknown, note that they are not included. In cases where primary purpose of Simulation is to determine effects on sustainment estimates, DoD must ensure systems are properly defined & all historical site visit information e.g., Condition/ Performance metrics are utilised to define operational baselines & related logistics costs.
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7. How will automated upgrade/repair platforms monitoring equipment condition impact performance of systems providing increased predict/diagnose capability?

In cases where the primary purpose of equipment upgrade/repair simulation is to determine the effect of automated condition monitoring system, DoD must ensure system/mission performance metrics & logistics costs are adequately defined. To the extent possible, utilise available historical information at work site e.g., Operational Availability, Downtime, Materiel Availability, etc. Select factors to be defined, measured & evaluated in Simulation frameworks to ensure conclusions /recommendations are based on smart comparisons derived from automated processes. DoD must Identify metrics related to prediction of unsuccessful missions, sustainment estimates & logistics processes suitable for automation, such as spare part source information to be assessed in terms of timeliness, accuracy & relevance of prognostic/diagnostic assessment tools. Also, consider any risks associated with sourcing, transfer, and information systems processing , as well as with site visit assessment tools themselves.

8. What effect does upgrade/repair capability have on changing purchase/provision of parts by

equipment supply connection initiatives influencing mission power, system readiness & availability?

Simulations must clearly define mission-critical power, operational availability & materiel availability for system included in capability profile propose, also addressing any unknowns or areas not able to be addressed in quantitative terms. Assumptions should include defined sets of mission reliability factors & explain how each unknown area will be treated in site visit assessments. Simulation conclusions/ recommendations must address quantitative/qualitative logistics costs/benefits as well as risks associated with expected unknown areas which have not been quantified, such as changes in purchasing/provision of spare parts at installations. Affected supply system processes must be identified & specific metrics to be used for assessments. Utilising existing logistics & site visit historical information to define sustainment baselines is required as well. Identify affected purchasing process parameters affected & specific metrics able be used for assessments. Utilise existing upgrade/repair information e.g., success in mission theatre to define baseline logistics costs.

9. How will procurement strategies be affected by automated information collection/transmission platforms for determination of logistics parameters & associated cost/risk of each course of action enacted by decision makers?

DoD must ensure ability to execute automated processes & implement alternatives addressed in risk/sensitivity assessments, Identifying & defining implementation-related factors in Simulation assumptions such as supply line connection collection/transmission, Identification & define functions, tasks & related activities during site visits for upgrade/repair, acquisition, focused logistics processes, Joint Capabilities Integration & functional mission requirements definitions affected by or provided by information about upgrade/repair capability proposed during site visits.

10. How will mission readiness, availability, equipment ready for tasking & unscheduled operational downtime impact prediction accuracy of upgrade/repair initiatives designed to improve overall situational awareness of equipment condition at tactical/strategic levels?

DoD must Identify specific metrics critical for product support meeting schedule expectations of installations. Ensure definitions are provided within assumptions & appropriate measures identified following site visit investigation. Recent site visits have documented increasing number of metrics being evaluated. Growth in number of total metrics must be minimised to ensure reasonable amount of effort is required to obtain & assess information to arrive at reasonable conclusions/recommendations. Impacts must be assessed using primary upgrade/repair metrics to include Operational availability, materiel readiness, total cost of in-house provisions & mission downtime. Identify & define any potential automated decision processes, planned integration & installation expectations in key Simulation assumptions. Address incremental capability improvements to impact upgrade/repair operations as new increments become available or are integrated into overall logistics processes. Ensure relevant functional areas such as condition detection, targeted support of specific system/subsystem component, performance prediction, reporting, assessment, decision-support execution &

recovery, both on & off-board at operational/ tactical command /strategic levels to be assessed & addressed in Simulation conclusions/recommendations.