

# ESOH Language in DoD 5000.2-R, June 2001

<b>Title</b>	<b>New</b>	<b>Old</b>	<b>New Language</b>
Acquisition Program Baseline (APB)	C1.4.1	3.2.2	Every acquisition program shall establish an APB beginning at program initiation. The PM shall base the APB on users' performance requirements, schedule requirements, and estimate of total program cost. Performance shall include interoperability, supportability and, as applicable, environmental requirements. The department shall not obligate funds for ACAT I or ACAT IA programs beyond Milestone B until the MDA approves the APB, unless the USD(AT&L) (for ACAT I) or the ASD(C3I) (for ACAT IA) specifically approves the obligation (10 U.S.C. 2435(b) (reference (g))). The APB satisfies requirements derived from both 10 U.S.C. 2220(a)(1) (reference (h)) and reference (g).
APB Content - Cost	C1.4.3.3.1.	3.2.2.2	Cost parameters shall identify TOC (broken-out into direct costs: research, development, test, and evaluation costs, procurement costs, military construction costs, operating and support costs (to include environmental, safety, and occupational health compliance costs), and the costs of acquisition items procured with operations and maintenance funds, if applicable; indirect costs attributable to the systems; and infrastructure costs not directly attributable to the system); total quantity (including both fully configured development and production units) costs; average procurement unit cost (defined as the total procurement cost divided by total procurement quantity); program acquisition unit cost (defined as the total of all acquisition related appropriations divided by the total quantity of fully configured end items); and other cost objectives designated by the MDA. For reporting purposes, the PM shall use life-cycle costs as defined in DoD 5000.4-M (reference (j)). The PM shall present cost figures in base year dollars.

\* old paragraph based on DoD 5000.2-R, Ch4, May 1999

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Support Strategy	C2.8.1		<p>As part of the acquisition strategy, the PM shall develop and document a support strategy for life-cycle sustainment and continuous improvement of product affordability, reliability, and supportability, while sustaining readiness. This effort shall ensure that system support and life-cycle affordability considerations are addressed and documented as an integral part of the program's overall acquisition strategy. The support strategy shall define the supportability planning, analyses, and trade-offs conducted to determine the optimum support concept for a materiel system and strategies for continuous affordability improvement throughout the product life cycle. The support strategy shall continue to evolve toward greater detail, so that by Milestone C, it contains sufficient detail to define how the program will address the support and fielding requirements that meet readiness and performance objectives, lower TOC, reduce risks and avoid harm to the environment and human health. The support strategy shall address all applicable support requirements to include, but not be limited to, the following elements:</p> <ul style="list-style-type: none"> <li>C2.8.1.1. Product support (including software);</li> <li>C2.8.1.2. Affordability improvements;</li> <li>C2.8.1.3. Source of support;</li> <li>C2.8.1.4. Human systems integration (HSI);</li> <li>C2.8.1.5. Environment, safety, and occupational health (ESOH);</li> <li>C2.8.1.6. Post deployment evaluation; and</li> <li>C2.8.1.7. Long-term access to data to support the following: <ul style="list-style-type: none"> <li>C2.8.1.7.1. Competitive sourcing decisions;</li> <li>C2.8.1.7.2. Conversion of product configuration technical data to performance specifications when required for enabling technology insertion to enhance product affordability and prevent product obsolescence; and</li> <li>C2.8.1.7.3. Contract service risk assessments over the life of the system.</li> </ul> </li> </ul>

\* old paragraph based on DoD 5000.2-R, Ch4, May 1999

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Human Systems Integration (HSI)	C2.8.5.		The PM shall pursue HSI initiatives (see paragraph C5.2.3.5.9.) to optimize total system performance and minimize TOC. The PM shall integrate manpower, personnel, training, safety and occupational health (see paragraph C2.8.6.), habitability, human factors, and personnel survivability considerations into the acquisition process. The support strategy shall identify responsibilities, describe the technical and management approach for meeting HSI requirements, and summarize major elements of the associated training system. The following considerations apply:
Personnel Survivability and Habitability	C2.8.5.4.		For systems with missions that might expose it to combat threats, the PM shall address personnel survivability issues including protection against fratricide, detection, and instantaneous, cumulative, and residual nuclear, biological, and chemical effects; the integrity of the crew compartment; and provisions for rapid egress when the system is severely damaged or destroyed. If the system or program has been designated by DOT&E for live fire test and evaluation (LFT&E) oversight (see section C3.3.), the PM shall integrate T&E to address crew survivability issues into the LFT&E program to support the Secretary of Defense LFT&E Report to Congress (see paragraph C3.11.2.) (10 U.S.C. 2366 (reference (w))). The PM shall address special equipment or gear needed to sustain crew operations in the operational environment (see paragraph C5.2.3.5.9.2.). The PM shall also address habitability requirements (e.g., for the physical environment and support services) that are necessary for meeting and sustaining system performance, avoiding personnel retention problems, maintaining quality of life, and minimizing total system costs.
Human Factors Engineering (HFE)	C2.8.5.5.		The PM shall summarize steps being taken (e.g., contract deliverables or government/contractor IPT teams) to ensure the proper employment of HFE/cognitive engineering during systems engineering (see paragraph C5.2.3.5.9.1.) to provide for effective human-machine interfaces, meet HSI requirements, and (as appropriate) support a family-of-systems acquisition approach.

\* old paragraph based on DoD 5000.2-R, Ch4, May 1999

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Commercial, Off-the-Shelf (COTs) Considerations	C5.2.3.5.7.2.5.		The PM shall develop an appropriate T&E strategy for commercial items to include evaluating potential commercial items in a system test bed, when practical; focusing test beds on high-risk items; and testing commercial-item upgrades for unanticipated side effects in areas such as security, safety, reliability, and performance.
Human Systems Integration (HSI)	C5.2.3.5.9	4.3.8	For all programs regardless of ACAT, the PM shall initiate a comprehensive strategy for HSI early in the acquisition process to minimize ownership costs and ensure that the system is built to accommodate the human performance characteristics of the user population that will operate, maintain, and support the system. The PM shall work with the manpower, personnel, training, safety and occupational health (see paragraph C5.2.3.5.10.), habitability, survivability, and HFE communities to translate the HSI thresholds and objectives in the ORD into quantifiable and measurable system requirements. The PM shall include these requirements in specifications, the TEMP, and other program documentation, as appropriate, and use them to address HSI in the statement of work and contract. The PM shall identify any HSI-related schedule or cost issues that could adversely impact program execution.
Human Factors Engineering (HFE)	C5.2.3.5.9.1		The PM shall employ HFE during systems engineering (to include function allocation) to provide for effective human-machine interfaces. Where practicable and cost effective, design efforts shall seek to reduce manpower and training requirements. Design efforts shall minimize or eliminate system characteristics that require excessive cognitive, physical, or sensory skills; require extensive training or workload-intensive tasks; result in mission-critical errors; or produce safety or health hazards.

\* old paragraph based on DoD 5000.2-R, Ch4, May 1999

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Environment, Safety, and Occupational Health (ESOH) Considerations	C2.8.6.	3.3.7	Environment, Safety, and Occupational Health (ESOH) Considerations. As part of risk reduction, the PM shall prevent ESOH hazards, where possible, and shall manage ESOH hazards where they cannot be avoided. The support strategy shall contain a summary of the Programmatic ESOH Evaluation (PESHE) document, including ESOH risks, a strategy for integrating ESOH considerations into the systems engineering process, identification of ESOH responsibilities, and a method for tracking progress (see section C5.2.3.5.10.).
Demilitarization and Disposal Planning	C2.8.7	1.4.6	<p>During systems engineering, the PM shall consider materiel demilitarization and disposal. The PM shall minimize DoD's liability due to information and technology security, environmental, safety, and occupational health issues. The PM shall coordinate with Service logistics activities and DLA, as appropriate, to identify and apply applicable demilitarization requirements necessary to eliminate the functional or military capabilities of assets (DoD 4140.1-R (reference (t)) and DoD 4160.21-M-1 (reference (x))). The PM shall coordinate with DLA to determine reutilization and hazardous-property disposal requirements for system equipment and by-products (reference (t) and DoD 4160.21-M (reference (y))).</p> <p>C2.8.7.2. For munitions programs, the PM shall document the parts of the system that will require demilitarization and disposal, and address the inherent dangers associated with ammunition and explosives. This documentation shall be in place before the start of developmental test and evaluation and before the PM releases munitions or explosives to a non-military setting. The documentation shall provide the following: render safe procedures; step-by-step procedures for disassembling the munition item(s) to the point necessary to gain access to and/or to remove the energetic and hazardous materials; and identification of all energetics and hazardous materials, and the associated waste streams produced by the preferred demilitarization/disposition process.</p> <p>C2.8.7.3. Demilitarization and disposal planning shall not consider open burn and open detonation as the primary methods of demilitarization or disposal.</p>

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Test and Evaluation (T&E) Overview	C3.1.1	3.4	<p>C3.1.1. T&amp;E reveals information about the program and measures performance of the system against established requirements. The PM, in concert with the user and test communities, shall coordinate developmental test and evaluation (DT&amp;E), operational test and evaluation (OT&amp;E), LFT&amp;E, family-of-systems interoperability testing, and modeling and simulation (M&amp;S) activities, into an efficient continuum, closely integrated with requirements definition and systems design and development.</p> <p>The T&amp;E strategy shall provide information about risk and risk mitigation, provide empirical data to validate models and simulations, evaluate technical performance and system maturity, and determine whether systems are operationally effective, suitable, and survivable against the threat detailed in the System Threat Assessment (see section C6.2.4.). The T&amp;E strategy shall also address development and assessment of the weapons support test systems during the System Development and Demonstration Phase, and into production, to ensure satisfactory test system measurement performance, calibration traceability and support, required diagnostics, safety, and correct test requirements implementation. Adequate time and resources shall be planned to support pre-test predictions and post-test reconciliation of models and test results, for all major test events.</p>
T&E Guidelines	C3.2.3.2.2.	3.4.1	<p>The following T&amp;E guidelines apply:</p> <p>C3.2.3.2.2.2. Planning, at minimum, shall address all system components (hardware, software, and human interfaces) critical to achieve and demonstrate contract technical performance specifications and ORD-defined operational effectiveness and suitability requirements.</p> <p>C3.2.3.2.2.7. Planning shall consider the potential testing impacts on the environment (42 U.S.C. 4321-4370d and Executive Order (E.O.) 12114 (references (fff) and (ggg))).</p>
Certification of Readiness For Operational Test & Evaluation (OT&E)	C3.5.	3.4.3	<p>The developing agencies (i.e., materiel and combat developers) shall complete the following tasks before starting OT&amp;E:</p> <p>C3.5.9. Conduct Environment, Safety, and Occupational Health (see subparagraph C5.2.3.5.10.) review for each test.</p>

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Environment, Safety, and Occupational Health	C5.2.3.5.10.2	4.3.7	<p>C5.2.3.5.10.1. All programs, regardless of acquisition category and throughout their life cycle, shall comply with this section. The PM shall ensure a system design that can be tested, operated, maintained, repaired, and disposed of in accordance with ESOH statutes, regulations, policies, and, as applicable, environmental treaties and agreements (collectively termed regulatory requirements) and the requirements of this section.</p> <p>C5.2.3.5.10.2. The PM shall prepare a PESHE document early in the program life cycle (usually Milestone B). The PESHE shall identify ESOH risks, contain a strategy for integrating ESOH considerations into the systems engineering process, delineate ESOH responsibilities, and provide a method for tracking progress. The PM shall use the PESHE to identify and manage ESOH hazards, and to determine how to best meet ESOH regulatory requirements. The PM shall keep the PESHE updated over the system life cycle.</p> <p>C5.2.3.5.10.3. The PM shall conduct ESOH analyses as described below. The PM shall provide details of these analyses, including supporting documentation, as part of the IPPD.</p>
ESOH Compliance	C5.2.3.5.10.4	4.3.7.2	<p>To minimize the cost and schedule risks over the system's life cycle that changing ESOH requirements and regulations represent, the PM shall regularly review ESOH regulatory requirements and evaluate their impact on the program's life-cycle cost, schedule, and performance.</p>

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National Environmental Policy Act (NEPA).	C5.2.3.5.10.5	4.3.7.1	<p>The PM is responsible for and shall comply with the NEPA (42 U.S.C. 4321-4370d (reference (fff))) and implementing regulations, 40 C.F.R. 1500-1508 (reference (ccc)), and E.O. 12114 (reference (ggg)), as applicable. The PM shall complete any analysis and documentation required under either NEPA or E.O. 12114 before the appropriate official may make a decision to proceed with a proposed action that may affect the human environment. The PM shall document the decision before implementing the proposed action. The PM shall include an appropriate completion schedule for NEPA and E.O. 12114 compliance in the acquisition strategy. The PM shall prepare NEPA and E.O. 12114 documentation in accordance with the DoD Component implementation regulations and guidance. The CAE (or, for joint programs, the CAE of the Lead Executive Component), or designee, is the final approval authority for system-related NEPA and E.O. 12114 documentation. The PM shall forward a copy of final NEPA documentation to the Defense Technical Information Center for archiving.</p>

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Safety and Health	C5.2.3.5.10.6	4.3.7.3	<p>C5.2.3.5.10.6.1. The PM shall identify and evaluate safety and health hazards, define risk levels, and establish a program that manages the probability and severity of all hazards associated with development, use, and disposal of the system. The PM shall use and require contractors to use the industry and DoD standard practice for system safety, consistent with mission requirements. This standard practice manages risks encountered in the acquisition life cycle of systems, subsystems, equipment, and facilities. These risks include conditions that create significant risks of death, injury, acute/chronic illness, disability, and/or reduced job performance of personnel who produce, test, operate, maintain, support, or dispose of the system.</p> <p>C5.2.3.5.10.6.2. The following policy applies to the acceptance of risk:</p> <p>C5.2.3.5.10.6.2.1. The PM shall formally document each management decision accepting the risk associated with an identified hazard.</p> <p>C5.2.3.5.10.6.2.2. "High Risk" hazards shall require CAE approval (Lead Executive Component authority prevails for joint programs).</p> <p>C5.2.3.5.10.6.2.3. The acceptance of all risks involving explosives safety (see subparagraph C5.2.3.5.10.9.) shall require the appropriate risk acceptance authority to consult with the DoD Component's technical authority managing the explosives safety program.</p> <p>C5.2.3.5.10.6.2.4. "Serious Risk" hazards shall require PEO approval.</p> <p>C5.2.3.5.10.6.2.5. "Medium Risk" and "Low Risk" hazards shall require PM approval.</p> <p>C5.2.3.5.10.6.3. Pub. L. 91-596 (1990) (reference (dddd)) makes Federal Occupational Safety and Health Act standards and regulations applicable to all federal (military or civilian) and contractor employees working on DoD acquisition contracts or in DoD operations and workplaces. In the case of military-unique equipment, systems, operations, or workplaces, Federal safety and health standards, in whole or in part, shall apply to the extent practicable.</p>

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Hazardous Materials Management	C5.2.3.5.10.7	4.3.7.4	<p>C5.2.3.5.10.7.1. The PM shall establish a hazardous material management program consistent with eliminating and reducing the use of hazardous materials in processes and products (E.O. 13148 (reference (eeee))). The PM shall evaluate and manage the selection, use, and disposal of hazardous materials consistent with ESOH regulatory requirements and program cost, schedule, and performance goals. Where the PM cannot avoid using a hazardous material, he or she shall develop and implement plans and procedures for identifying, minimizing use of, tracking, storing, handling, packaging, transporting, and disposing of such material.</p> <p>C5.2.3.5.10.7.2. As alternate technology becomes available, the PM shall replace hazardous materials in the system through changes in the system design, manufacturing, and maintenance processes, where technically and economically practicable. To minimize costs, the PM shall, whenever possible, work with the contractor and other PMs to identify and test mutually acceptable alternatives. DCMA shall coordinate this effort at contractor facilities under its cognizance. Where the Supervisor of Shipbuilding, Conversion, and Repair (SUPSHIP) provides contract management, the PM shall coordinate with SUPSHIP. The Contract Management Office, working in conjunction with the PM and IPT, shall help identify technical requirements, coordinate PM funding strategies, administer evaluation activities, and implement solutions.</p>

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Pollution Prevention	C5.2.3.5.10.8	4.3.7.5	<p>C5.2.3.5.10.8.1. The PM shall identify and evaluate environmental and occupational health hazards and establish a pollution prevention program. The PM shall identify the impacts of the system on the environment during its life (including disposal), the types and amounts of pollution from all sources (air, water, noise, etc.) that will be released to the environment, actions needed to prevent or control the impacts, ESOH risks associated with using the new system, and other information needed to identify source reduction, alternative technologies, and recycling opportunities. The pollution prevention program shall serve to minimize system impacts on the environment and human health, as well as environmental compliance impacts on program TOC. A fundamental purpose of the pollution prevention program is to identify and quantify impacts, such as noise, as early as possible during system development, and to identify and implement actions needed to prevent or abate the impacts.</p> <p>C5.2.3.5.10.8.2. In developing contract documents such as work statements, specifications, and other product descriptions, PMs shall eliminate the use of virgin material requirements, as practicable. They shall consider using recovered materials and reusable products. They shall further consider life-cycle costs, recyclability, the use of environmentally preferable products, waste prevention (including toxicity reduction or elimination), and disposal, as appropriate. (FAR 11.002 and E.O. 13101 (references (ffff) and (gggg))</p>
Explosives Safety	C5.2.3.5.10.9		<p>All acquisition programs that include or support munitions, explosives, or energetics shall comply with DoD explosives safety requirements. The PM shall establish an explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed. The PM shall evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap and to optimize the trade-off of munitions reliability against unexploded ordnance liability.</p>

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Survivability	C5.2.3.5.12	4.4.1	Unless waived by the MDA, mission-critical systems, including crew, regardless of ACAT, shall be survivable to the threat levels anticipated in their projected operating environment as portrayed in the System Threat Assessment. Design and testing shall ensure that the system and crew can withstand man-made hostile environments without the crew suffering acute chronic illness, disability, or death.
Insensitive Munitions	C5.3.4	4.4.8	All munitions and weapons, regardless of ACAT, shall conform to insensitive munitions (unplanned stimuli) criteria and use materials consistent with safety and interoperability requirements (see subparagraphs C5.2.3.5.10. and C5.2.3.5.11.). The requirements validation process shall determine insensitive munitions requirements and keep them current throughout the acquisition cycle. Interoperability, to include insensitive munitions policies, shall be certified per CJCS Instruction 3170.01B (reference (f)). Waivers for munitions/weapons, regardless of ACAT level, shall require JROC approval. The ultimate objective is to design and field munitions that have no adverse reaction to unplanned stimuli, analogous to Hazard Division 1.6 (see TB 700-2 (reference (ttt))).
Operational Test and Evaluation Outline	Appendix 2 4. Part IV C. (4)	Appendix III	(4) Limitations. Discuss the test and evaluation limitations including threat realism, resource availability, limited operational (military, climatic, nuclear, etc.) environments, limited support environment, maturity of tested system, safety, etc., that may impact the resolution of affected critical operational issues. Indicate the impact of the test and evaluation limitations on the ability to resolve critical operational issues and the ability to formulate conclusions regarding operational effectiveness and operational suitability. Indicate the critical operational issues affected in parenthesis after each limitation.
Test and Evaluation Master Plan-- Mandatory Procedures and Format Part V -- Test and Evaluation Resource Summary	Appendix 2 5. Part V, (2)	Appendix III	Test Sites and Instrumentation. Identify the specific test ranges/facilities to be used for each type of testing. Compare the requirements for test ranges/facilities dictated by the scope and content of planned testing with existing and programmed test range/facility capability, and highlight any major shortfalls, such as inability to test under representative natural environmental conditions. Identify instrumentation that must be acquired specifically to conduct the planned test program. Describe how environmental compliance requirements will be met.

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Annex B -- Detailed Live Fire Test and Evaluation Plan	Appendix 3 Annex B 9. & 15.	Appendix IV	<p>The following paragraphs outline the mandatory content of the Detailed Live Fire Test and Evaluation Plan. No standard format is prescribed, but the Plan must contain at least the following information:</p> <p>9. Identification of any test limitations, particularly any potential loss of realism from absence of components, arising from the use of surrogates, from the inerting of fuzes on stowed ammunition, or any other environmental, safety, health, or resource constraints. Identify the impact of these limitations on test results.</p> <p>15. A detailed description of the approach to analyzing and mitigating the potential environmental impacts, consequences, or effects of the test activities, unless adequately described elsewhere.</p>

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