NOTICE OF CHANGE

NOT MEASUREMENT SENSITIVE

MIL-HDBK-237A
NOTICE 2 (NAVY)
February 14, 1992

ELECTROMAGNETIC COMPATIBILITY MANAGEMENT GUIDE FOR PLATFORMS, SYSTEMS AND EQUIPMENTS

TO ALL HOLDERS OF MIL-HDBK-237A

1. The following pages of MIL-HDBK-237A have been revised and supersede the pages listed:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
v	16 Jun 1986	v	REPRINTED WITHOUT CHANGE
vi	20 Jan 1992	vi	16 Jun 1986
vii	16 Jun 1986	vii	REPRINTED WITHOUT CHANGE
viii	20 Jan 1992	viii	16 Jun 1986
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43	20 Jan 1992	43	2 Feb 1981
44	20 Jan 1992	44	2 Feb 1981
119-125	20 Jan 1992	NEW	N/A

2. Retain this notice and insert before Table of Contents.

3* Holders of MIL-HDBK-237A will verify that page changes and additions indicated above have been attached. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military handbook is completely revised.

4. Changes from previous issue. The margins of Notice 2 change pages are marked with vertical lines to indicate where changes (additions, modifications, corrections) from the previous issue were made. This is done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content of the basic issue and Notice 1 irrespective of marginal notations.

Review Activities:
Navy - AS, SH, OS, TD

User Activities:
Navy - YD

Preparing Activity:
Navy - EC
(Project No. N132)

AMSC N/A

AREA EMCS

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APPENDIX H
E^3 CONSIDERATIONS IN PROGRAM DOCUMENTS

10. INTRODUCTION The actions to control adverse EM effects are not isolated events but, when applied properly, form a continuum. Since planning and procurement documents are the logical vehicle for implementing an E^3 program, this appendix discusses the relationship between the pertinent documents and required actions. It is presented in the context of a major system procurement; however, the principles and procedures are applicable to platforms and less than major procurements. To provide an insight into the review process, a set of review guidelines is provided.

20. MISSION NEED STATEMENT (MNS).

- Identifies Mission Area and describes new system function in the mission area.
- Describes the threat and shortfalls of existing systems to meet the threat.
- State solution constraints and provides a program for consideration of alternative systems.

20.1 E^3 CONSIDERATIONS FOR INCLUSION IN MNS.

- State EMC performance in a hostile and friendly EME.
- Identify EMP survivability requirements and, as may be appropriate, other EMC requirements.

30. TOP LEVEL WARFARE REQUIREMENTS (TLWR).

- Establishes the capabilities required to execute the mission area and provides the basis for all Tentative Operational Requirements.

30.1 E^3 CONSIDERATIONS FOR INCLUSION IN TLWR.

- Spectrum management and consideration.
- Performance requirements in friendly and hostile EME.
- EMP Survivability requirements.
- Other unique top level EMC requirements, ie RADHAZ, HERO, HERF, lightning.

TENTATIVE OPERATIONAL REQUIREMENT (TOR).

- Describes overall mission area, type of system required and concept of operation.
- Describes threat and emphasizes threat trend.
- Identifies shortcomings of existing systems.
- Outlines key capabilities desired and acceptable performance levels.
- Provides life cycle (RDT&E through 5 year deployment) cost estimates.
- Identifies platforms which will employ the system.
- Describes ILS considerations.
- Discusses related developments and interfacing system requirements.

40.1 E^3 CONSIDERATIONS FOR INCLUSION IN TOR.

- General assessments of the anticipated EME.
- Discussion of potential enemy jamming threat and ECCM requirements to achieve mission capability.
- Identify E3 deficiencies in existing systems.
- Provide for E^3 planning and frequency spectrum management. Identify significant impact to EME and provide trade off considerations.
- Identify E^3 program funding requirements throughout life cycle of the system.
- Provides for E^3 related training and ILS support.
- Identifies EMP survivability requirement and potential RADHAZ concerns.

50. OPERATIONAL REQUIREMENT (OR).

- Defines operational problems, required system capabilities, system and target parameters and operational employment.
- States cost objectives.

50.1 E^3 CONSIDERATIONS FOR INCLUSION IN OR. The OR must form the basis for the EMC effort during the acquisition process. The general requirement for compatibility with the EM environment must be stated at the onset. In addition, unique goals related to EM effects must be specified for EMP and HERO and other EM requirements. The target parameters and operational employment must be described sufficiently to permit definition of the anticipated EM environment. It is therefore necessary to review the draft OR to assure that sufficient information is provided. Specifically, the following should be addressed.

- Define EM environment in terms of friendly and hostile emitters and project far enough into the future to cover the life span of the proposed system.
- Define target sufficiently to determine EMC considerations.
- State EMC goals for system design and intended operation.

60. DEVELOPMENT OPTIONS PAPER (DOP).

- Presents alternatives or trade-offs to achieve a range of capabilities to satisfy the OR.
- Proposes methods for achieving program objectives, provides program alternatives, cost comparisons and defines tasks.
- Addresses T&E that will be required and contains a Development Plan.

60.1 E^3 CONSIDERATION FOR INCLUSION IN DOP. The DOP presents the alternatives and trade-offs to achieve the required operational capability called for in the OR. EMC ramifications for each alternative must be addressed. The DOP must define the operational EME, the sensitivity of the alternatives to the EM environment and their impact on the ambient environment. The hardening alternatives must be described along with costs and risks. If the level of hardness is a major consideration, then the cost versus effect on the operational capability must be described. Plans for developmental and operational EME effects tests must be given, along with performance criteria and objectives. If special test facilities and equipment are required, they should be described and cost estimates given. The DOP review is required to ensure that the achievement of operational goals will not be unnecessarily restricted by the EME, that emission from the alternatives will not unacceptably degrade other friendly equipment and that

appropriate steps are planned for dealing with high risk areas. Specifically, the following should be addressed:

- Address all EMC factors contained in the OR, including rationale for selection of proposed frequency bands of operation.
- State methods for achieving the specified level of EMC, cost and effectiveness for all design alternatives.
- Project EM environment to cover the proposed system life span.
- State projected EM problems for each alternative. Identify, if any, ordnance and human risk in the proposed environment. Define impact on the EM environment created by the state-of-the-art, if required.
- State tests appropriate to demonstrate required EMC. This should include, as appropriate, those specified by MIL-STD-461, MIL-STD-449 and MIL-STD-469, MIL-STD-1605, MIL-E-6051, HERO tests, other development tests, and inter-platform testing, as required.
- Include spectrum support and EMC T&E milestones with other T&E milestones. State resolution dates for any identified EMC risks.

70. DECISION COORDINATION PAPER (DCP).

- Information contained in the DOP is combined with the OR to develop the final approval document (DCP), which is used to obtain approval for the next phase of system acquisition.
- The program manager must request approval to initiate the Demonstration and Validation Phase when competitive exploration of alternative concepts during Program Initiation leads to selected alternatives that warrant system demonstration.
- The information developed previously for the OR and DOP form the basis for the DCP.
- The DCP contains sections relating to program issues, objectives, alternatives, risks and the development plan.

70.1 E^3 CONSIDERATIONS FOR INCLUSION IN DCP DURING CONCEPT DEVELOPMENT AND VALIDATION.

- Each design alternative must specify a method for achieving the required EMC.
- State projected EM problems.
- Specify risk associated with advancing the state-of-the-art, if required to achieve the required EMC.
- State tests planned to demonstrate EMC.
- Project EM environment definition far enough into the future to be compatible with the system being acquired.
- Include spectrum support and EMC T&E milestones with other T&E milestones in the development plan. State resolution dates for any identified EMC risks.

70.2 E^3 CONSIDERATIONS FOR INCLUSION IN DCP DURING FULL SCALE DEVELOPMENT.

- Previous T&E and analysis must be incorporated into the DCP.
- Part of the approval process requires the TEMP or TEP to be updated with the recommended system technical performance specifications prior to the system approval milestone.
- Any EMC risks identified in previous phases for the recommended system will be added to the TEMP or TEP along with risk resolution testing milestones.
- EMC aspects of PAT&E of initial production and long lead time items must be included in the TEMP or TEP.
- Planned EMC testing to revaluate the system after changes during initial production must also be included.

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70.3 E^3 CONSIDERATIONS FOR INCLUSION IN DCP DURING PRODUCTION.

- When the PAT&E and OT&E has proceeded to the point of recommendation of full-scale production, the DCP will be updated with the appropriate test results and recommendations. The DCP will then be submitted to higher authority for approval to proceed with full-scale production.
- Appropriate EMC parameters will be tested during the PAT&E and OT&E and these test results and their implications will be used to update the DCP.

80. PROCUREMENT PLAN (PP). The procurement plan documents technical business, policy, operations and other procurement considerations portraying milestones to be met in achieving the goals of a specific program over its procurement life cycle. Since a PP is regularly updated, it will reflect changes in objectives or method of procurement. The discussion of program technical risks in the PP must include major EMC risks and potential threats to and from other systems or platforms and describe what efforts are planned or underway to reduce them. There should be a general discussion of EMC including control and reporting plans, predictions, analyses, EM specifications and requirements to be imposed, anticipated EME, design disciplines and quality assurance. The test and evaluation approach should describe DT&E to be required by the contractor, and DT&E and OT&E to be performed by the Government for each major phase. In view of the importance of the issues addressed in the PP it is necessary that the EMC aspects be reviewed to assure that they are realistic, economical and achievable. The PP should also define the minimum criteria for a proposal to be acceptable.

90. REQUEST FOR PROPOSAL (RFP). The RFP advises prospective bidders of the Government needs. The item to be procured is described by the applicable specifications or by a description containing the necessary requirements. Thus , the RFP must delineate the anticipated electromagnetic environment location and configuration, the performance requirements in the environment, tailored requirements for intended and spurious emissions and susceptibility criteria. Also, any EM test, evaluation, analysis, simulation and data required of the contractor such as EMC control and test plans and test reports, and any Government test that the item must pass to be acceptable must be included. The role of the contractor in supporting an EMCAB must be defined, if applicable. Since the RFP will be the basis for the contract, the procuring activity must be assured that the item will meet the EMC requirements without resorting to costly contract modifications.

APPENDIX M
APPLICATION GUIDE FOR NAVAIR ACQUISITIONS

NAVAIR program managers should refer to NAVAIRINST 2410.1, which defines NAVAIR policy for establishing an effective EMC program throughout the life cycle of platforms, systems and equipment.

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APPENDIX N
WARFARE SYSTEMS E^3 CONTROL STRATEGY

10. INTRODUCTION. The Warfare Systems E3 Control Strategy (WSECS) is described in this appendix to provide the PARMs (Participating Managers), Program Managers and other acquisition personnel with an overview of the E^3 acquisition methodology currently employed by NAVSEA and SPAWAR. This methodology is not intended to supplant the processes described in detail in Appendices J, K & L. It is to be utilized in conjunction with these methods so that E^3 is addressed at the early conceptional stages of acquisition. WSECS is not unlike the AECS described in Appendix L in that it applies a gate control technique to process through the acquisition stages. WSECS is directed toward achieving EMC through the issuance of Control Interface Drawings. These drawings identify and characterize the intentional signals and allowable degradation.

10.1 APPLICABILITY. The WSECS process is applicable to all warfare systems acquisitions by the Navy. Implementation of this process provides positive E^3 control of the acquisition by establishing prerequisites which must be met at each phase of the life-cycle.

10.2 ELEMENTS OF THE WSECS. Table XIII is a fold-out chart depicting the WSECS. A detailed explanation of the process is contained in the text proceeding the chart. The basic elements of WSECS are:

- Establish the performance envelope: Define at the concept initiation phase the degree of mission capability required and the electromagnetic environment in which the system will operate.
- Define and control all interfaces between warfare systems elements: Issue control interface drawings defining each interface of the warfare systems in terms of intentional signal, conducted emissions and conducted susceptibility.
- Verify compliance: Establish through performance specifications, installation control drawings and test and evaluation requirements that E^3 compliance has been met.

20. WSECS METHOD. The WSECS applies a positive-control methodology of gating for E^3 control. The process for identification, refinement, and approval of warfare systems requirements and the subsequent research, development, and acquisition process are gated in a time-phased basis corresponding to the major decision points during the acquisition life-cycle. Each requirement and subsequent action becomes a part of a continuous evaluation to monitor the extent and adequacy of the E^3 control effort. WSECS provides one or more objectives applicable to each specific phase of the life-cycle and provides for documentation evaluating the achievement of the objectives. As a result of this process, at each decision point during the life-cycle WSECS is ready to present an E^3 position concerning an item and the merits of permitting the acquisition to proceed.

30. WARFARE SYSTEMS E^3 CONTROL STRATEGY (WSECS). OPNAVINST 5000.42C “RDT&E Acquisition procedures” establishes phases, milestones and threshold criteria for Navy acquisitions. The WSECS method is an adaptation of this requirement which provides E^3 control requirements at the acquisition initiation and establishes definitive requirements at each warfare systems interface. This control is achieved by requiring that E^3 related key documentation exists at each phase of the life-cycle. This key documentation provides the basis for determining the E^3 impact, problems to be resolved, problem resolution, and verification of the effectiveness of E^3 controls.

30.1 KEY DOCUMENTS. For the purpose of WSECS it is unimportant that information be supplied by any particular document, only that it becomes available on a timely basis in a suitable form. In the development of WSECS a survey of normally available or required documentation resulted in the identification of the key documents presented in Table XIII. Many of these are E^3 documents, which predated the formulation of WSECS, and have been subjected to formal document reviews. Others are required as part of the acquisition cycles and contain E^3 information needed for the WSECS decision making process. It is important to note that WSECS reviews of key documentation is for the purpose of extracting desired E^3 information and does not concern the form or format of the document.

30.2 ISSUES. The identification and resolution of WSECS issues must be an iterative process since each phase of acquisition dictates a new set of problems and concerns. In the concept initiation phase, it may suffice to broadly describe the intended operational EME. But as the acquisition progresses, the issues must be more definitive and the resolution be structured into procurement documentation and test and evaluation plans. It is by this method that potential E^3 problems are highlighted and performance degradation of the warfare system and its interface system is avoided. The issues of each phase of acquisition are discussed in more detail in this appendix as related to the phases of acquisition.

30.3 GATE CLOSURE. When it is apparent from available information that the direction of the requirement or project does not support the resolution of critical E^3 issues, the WSECS process denies opening the gate for the next phase of procurement until satisfactory resolution by the project office is achieved. Should resolution not be forth-coming, it is inherent in the WSECS process to formulate the issues for a higher level of authority to review for resolution.

40.0 WSECS PHASES

40.1 THE CONCEPT INITIATION (CI) PHASE. Prepared by the Warfare Requirements Board (WRB) at the OPNAV level, TLWRS will ultimately cover each of the five Warfare Mission Areas in iterative, dynamic documents. The advent of a new or revised version of each TLWR (KDN-1) signals the initiation of the RP cycle. When received by SPAWAR, a TLWR is reviewed and assessed with regard to the current architecture, which serves as a baseline and a guide. The architecture directs the search for requirement solutions in approved and preferred technological fields and dictates ranges and limits of capabilities on and among platforms. There is a bilateral relationship between a TLWR and the architecture, and, in the second part, the architecture is itself reevaluated. In this action, the trends noted in recent TLWRS and the advent of new technologies are evaluated and appropriately factored into architectural revisions. The E^3 cognizant office provides the Warfare Systems Architect (WSA) with technical support in both of these evaluations, providing review comments on the TLWR for the Architectural Options (AO) paper (KDN-2) and on the architecture itself, as appropriate. The WSA prepares the actual response to the OPNAV WRB. From the mission viewpoint, the TLWR document addresses only capability concepts, i.e., requirements as ideas. The principal E^3 considerations that have potential as suitable input are those concerning use of the spectrum and frequency management. The nature of the TLWR may suggest additional areas of interest.

40.2 THE CONCEPT EXPLORATION (CE) PHASE. On the basis of the approved TLWRs and the architecture adopted, the WRB prepares and issues TORS. Multiple TORS (KDN-5) may result from any particular TLWR, and various TORS, rather than having equal status, may share hierarchical relationships among themselves. TORS are general statements of need and carry a demand to propose alternate solutions. The TORS, as OPNAV documents, are reviewed for information and understanding rather than with criticism. The review serves to determine the necessity for, and the character of the supporting guidance that it may be necessary to provide with a TOR on its way to the cognizant systems command. When generated, the guidance takes the form of a KD described as Development Option Paper (DOP) Guidance, KDN-6. While the OPNAVINST 5000.42 series provides for E^3 control guidance (as EMC guidance) in TORS, the perception of the guidance may vary widely. The document prepared by the systems command in response to a TOR is the DOP, KDN-7. The DOP is the first document which may place the Warfare System community into an adversarial role with a systems command project office. As with any option in which electromagnetic (EM) energy plays a significant part, it is necessary for the DOP to address appropriate E^3 control considerations, particularly if the effects are not relatively constant, uniform considerations for all options. Depending upon the nature and degree of the EMC deficiency, alternative approaches can be employed:

a. The DOP may be rejected and returned for revision to the systems command in order to overcome the E^3 deficiencies noted. Since this method adds further delay for a document responding to a TOR that is probably 12 to 18 months old already, it should be used only in the most unsatisfactory cases.

b. The DOP may be endorsed and forwarded to CNO with comments covering the E^3 deficiencies, and with a copy to the systems command. The SYSCOM can then provide supplementary data addressing the endorsement at an early date.

The last KD for the CE Phase is the DD Form 1494 application for a frequency allocation, Stage 1 (Conceptual), and is designated KDN-8. Each DOP alternative which proposes to transmit or receive EM energy needs an application, except that the same type of transmission or reception for multiple alternatives may be covered by a single application. No application is necessary if there is no transmission or reception of EM energy. There is, of course, no actual hardware at this stage, and KDN-8 serves as a “heads up” alerting mechanism. More specifically, the KDN-8 is a pre-project inquiry to elicit potential, but unsuspected, spectrum utilization problems. The application should be prepared and forwarded, as soon as possible, for any alternative in a draft DOP that requires use of the spectrum. When the KDN-8 DD Form 1494 is required, no DOP should be forwarded to CNO until the attendant KDN-8 has been processed and forwarded for approval. A DOP proposing alternatives whose spectrum utilization would suggest a serious potential for interference, may be held until necessary KDN-8 applications are received for processing.

Nominally, the CE phase ends with the transition of Milestone O. The WSECS and RD&A processes are not, however, locked to one-another at this time, and the WSECS gate may open ahead of actual Milestone O approval.

40.3 THE CONCEPT EXPLORATION/DEFINITION (CED) PHASE.

a. The CED Phase has another DD Form 1494 application requirement (KDN-10), for a Stage #2 (Experimental) frequency allocation. This allocation serves to confirm and expand upon the earlier Conceptual request. It covers the Advanced Development Model (ADM) hardware which is to be built and tested during Phase I (Concept Demonstration/Validation) of the RD&A process. Where

there is no novelty in the spectrum utilization posed in the application, the Stage #1 (conceptual) type, KDN-8, may be combined with the Stage #2, KDN-10. Although WSECS calls for this application to be submitted prior to Milestone I, a prudent Project Manager (PM) will submit it even earlier if possible. Until the appropriate frequency allocation application has received CNO approval, under OPNAVINST 2400.20E, funds may not be obligated on a contract for an ADM, even though Milestone I approval may have been granted to initiate a project. DD Form 1494 applications may take in excess of six months for approval.

b. The WRB, after reviewing a DOP submission and arriving at a favorable decision, issues an Operational Requirement (OR) based on preferred option(s). This is KDN-11 and is tantamount to the issuance of project approval for small items in Acquisition Categories (ACATs) III & IV. The OR is a refined presentation of the favored option, is established as a KD for its directive value and forms the basis of the Navy Decision Coordinating Paper (NDCP) to be used to approve the new project formally. The review of the OR also forms the basis for the Warfare Systems Performance Specification (WSPS). The output of the review should be placed in the form of Design Guidance for the WSPS.

c. Two additional KDs are used during the CED Phases: the Systems Specifications (KDN-12) and the Item Specifications (KDN-13).

(1) KDN-12, when available, sets the level of E control direction in a system project. This may be readily apparent, e.g., with an aircraft item as the system, where the requirements of MIL-E-6051 are invoked. In other platform types for which there is no system-level E^3 standard control as yet, the task of E^3 control assessment and allocation may require extended reading. For proper system E^3 control to result, downward direction and allocation of requirements must be implemented from the systems level, establishing interfaces, specifying isolation, filtering, levels, EM practices, etc. A system may not be limited to a single platform; while this may complicate the project, the system considerations stated earlier still apply. Regardless of the intra- or inter-platform nature of the system, the basic requirements stated in the CED Phase form the foundation necessary for successful E^3 control in later development phases. E^3 control measures that are necessary only in lower indentures, but fundamental to system E^3 control effectiveness, must be directed by the system specification.

(2) Where the project is of lesser scope than that of an entire platform and the project item is normally considered at the unit, group, or set level, an Item Specification is prepared. The Item Specification is the ADM Specification; i.e., it is the specification that will be used during Phase I on a contract for the ADM hardware. To facilitate contract award, following Milestone I approval, the specification must have been prepared, coordinated, revised, and approved at an earlier time during the CED Phase. This provides an early opportunity for WSECS to determine how fully the project will follow E^3 control guidance given earlier. Because the ADM is not a MIL-specified item, however, it is not reasonable to expect or demand a full range of MIL-STD-461 requirements and MIL-STD-462 tests for this technology-demonstration hardware. Should the ADM represent integration of previously developed hardware, in whole or in part, the use of which will remain unchanged in the Engineering Development Model (EDM), a requirement in the specification, to use components qualified to MIL-STD-461, would be essential.

d. Where hierarchical requirements exists, specifications will similarly exist on multiple levels. For this reason, KDN-12 is established in Table XIII, as a separate item from KDN-13. In the event that two levels exist simultaneously for a given requirement, the lowest will always be identified as KDN-13 and each of the others will be identified as KDN-12.

e. The Test & Evaluation Master Plan (TEMP), as KDN-14 in its first iteration, is required for the Milestone I review. The TEMP is a particularly significant document prepared by the project office, which establishes the criteria as well as extent and schedule for project operational evaluation. For review considerations, the TEMP should state E^3 control evaluation criteria for operational effectiveness and operational suitability.

f. KDN-15 is assigned to the Warfare Systems Performance Specification (WSPS). The WSPS is based on the evaluation of the OR (KDN-11). From each of several major technical disciplines of which E^3 is a representative member, input in the form of Design Guidance is supplied. The input is based on the parochial interest of the discipline. The WSPS provides the broad system synthesis of these guidance inputs.

40.4 THE CONCEPT DEMONSTRATION/VALIDATION (CDV) PHASE. Most active of all phases for WSECS, CDV is a particularly important time for the Warfare Systems Engineer (WSE). For each project formally begun by OR, the WSE must at this time prepare, coordinate, negotiate, revise, and issue two more major documents as in follow-on to the WSPS.

a. The Warfare Systems Test Specification (WSTS) and the Warfare Systems Control Interface Drawing (WSCID) are KDNs 21 and 22 respectively. Using these documents, the WSE applies and disseminates additional Warfare System Architecture and Engineering requirements. For the WSCID, the minor supporting documents, Notice of Change (NOC) and Proposed NOC (PNOC), serve the purpose indicated by their names. (This is actually a single document; the PNOC becomes the NOC upon approval.) The WSTS, KDN-21, has no formal instructions issued for its preparation as yet. It may be anticipated, however, that it will specify the verification requirements and methods for corresponding WSPS requirements. The first generation of WSCID documents (KDN-22), in complying with SPAWARINST 9000.1, appear to be addressing only hardwire conducting interfaces. For this form of porting, the CE- and CS-requirements of MIL-STD-461 are appropriate limits for all undesired signal (noise) energy present. A PNOC is evaluated with the WSCID to which it is applicable; the acceptability of the PNOC is commented accordingly. A resulting NOC becomes part of the WSCID affected. The WSPS precursor to the above two KDs is ordinarily issued prior to Milestone I, i.e., before the CDV Phase. Should it have been delayed into CDV, KDN-20 is assigned, and its review is performed as needed. The Design Guidance for the WSPS would have been developed during the OR review in the CED Phase.

b. Three document forms common to the previous phase have counterpart types during the CDV phase. A DD Form 1494 application for the Stage #3 (Developmental) Frequency Allocation is KDN-17. This KD is to be received prior to Milestone II, and its approval must be secured before the EDM contract may be awarded in Phase II. The Full Scale Development (FSD) Specification (KDN-18) which will cover the device EDM, is written during the CDV phase prior to, and in preparation for, Milestone II. The FSD Specification is of particular importance since requirements seen necessary during D&V, incorporated and proven during test and evaluation (T&E), and later given approval for full-rate production (AFP), are those that will continue into the Production and Initial Deployment Phase. The EDM is the proper candidate for full MIL-STD-461 qualification. Finally, the second iteration of the TEMP is designated as KDN-19, and is required for Milestone

II also. E^3 control criteria should be updated based on the project experience of the CDV phase and as appropriate for KDNs 20, 21, and 22 and as previously described.

Finally CDV phase KDs include two report types: KDN-23 covers any EMI, EMC, or IMI test reports for any standards (MIL-STD-461, MIL-STD-469, etc.), and KDN-24 covers T&E reports whether for DT-I or OT-I. Unlike KDN-16 through 22, however, KDN-23 and -24 are processed to support a new role for SPAWAR. In the new role, SPAWAR acts for E^3 only as a monitor. Information obtained from these KDs is channeled into project evaluations, but no directive action is taken with regard to the project or other offices. This limited monitoring role, begun during CDV, will expand during FSD to almost 100% monitoring.

40.5 THE FULL SCALE DEVELOPMENT (FSD) PHASE. With the approval at Milestone II, the item moves into the FSD Phase. As indicated in 40.4, the SPAWAR role shifts in FSD from that of advocate and arbiter for Warfare Systems Architecture & Engineering, into a passive role which monitors compliance by the project office. A residual directive role remains for E^3 in FSD in regard to two of the KD types:

a. As Milestone III is approached, the final iteration of the TEMP, KDN-28, is prepared, offering one last opportunity to improve or correct the E^3 control criteria for T&E.

b. The final frequency allocation application is to be made prior to the Milestone III review. This is KDN-26, the Stage #4 (operational) request.

c. Lastly, three additional documents are monitored to determine the degree to which the project office is adhering to guidance. These are the Item Specifications (KDN-27) for Production, Test Report (KDN-31) which covers EMC/EMI/IMI reports, surveys, incidents, etc. (MIL-STD-461, -462, -469, -1605, etc.), and the DT-II and OT-II test reports, both grouped together as KDN-32. These sources are reviewed in support of the command monitoring functional responsibility only. No routine report or evaluation is made to other offices.

40.6 THE PRODUCTION & INITIAL DEPLOYMENT (PID) PHASE. The PID Phase starts when a project has been approved for full rate production (AFP). This authorization occurs concurrently with Milestone III (at times with IIIB) approval. The role of SPAWAR continues to be that of monitor, observing projects to assess the degree of compliance with previous guidance. Only two KDs are listed for this phase, EMI Test Reports, KDN-34, and OT-II or III Test Reports, KDN-35, although other sources may be found useful, however. As in the previous phase (FSD), no routine evaluation reports are made. WSECS establishes its own milestone in the absence of a formal one in the RD&A cycle. This is the Production Acceptance Test & Evaluation (PAT&E) for the production contract, the PAT&E reports of which are KDN-35.

40.7 THE OPERATIONS SUPPORT (OPS) PHASE. As the item becomes a common capability in the resources of the Fleet units making up the force, no specific documents are designated to be monitored; KDN-37, however~ is assigned to cover any type of EMI or EMC deficiency report. Documents of opportunity which may provide information regarding an EMI problem include major Fleet exercise reports, casualty reports (CASREPS), or any other documents which address the existence of an EMI condition. Additional OT-III reports are covered by KDN-38. The OPS Phase has one unique feature: the gate condition for any project is routinely regarded as open. Should an EMI condition emerge, the gate then closes until the unsatisfactory condition is removed. In theory, multiple EMI problems might occur within a particular

force. Should this be the case, several documents would report conditions pertaining to these several problems. The OPS Phase Gate would remain closed until each of the problems was resolved separately.

50.0 USING WSECS IN THE NON-CLASSIC REAL WORLD. The WSECS process is presented in 40.1 through 40.7, as it might be manifested ideally by the various KDs. The series of KDs from Table XIII emerge in time sequence to provide appropriate information for decisions. Do not be surprised, however, if the revelation of information is less orderly in the real world. Nevertheless, keep it clearly in mind that the degree of issue resolution remains the fundamental product to be sought by each KD evaluation.

Table XIII

SYSTEM	WARFARE SYSTEMS E³ CONTROL STRATEGY (WSECS)						
GOAL	Performance of Warfare Systems, Integrated at Force Level, is Undegraded by Electromagnetic Interference						
MANAGEMENT OBJECTIVES	Establish E³ considerations in the architecture appropriate to the TLWR context.	The potential impact of the EME on options has been addressed.	The projected performance of the developmental option in the potential EME has been established.	Systems E³ performance and testing requirements specified for militarized developments. Systems E³ interface criteria established.	Conformance/adherence of system EDM to E³ control requirements has been demonstrated.	Conformance/adherence of a system production model (PDM) to E³ control requirements approved for the EDM has been approved.	The application of the product item among warfare systems in fleet acrhitecture has not generated adverse problems.
PHASE	CONCEPT INITIATION (0)	CONCEPT EXPLORATION (0)	CONCEPT EXPLORATION/ DEFINITION (I)	CONCEPT DEMONSTRATION/ VALIDATION (II)	FULL SCALE DEVELOPMENT (III)	PRODUCTION & INITIAL DEPLOYMENT (AT&E)	OPERATIONS SUPPORT (IV) (V)
GATE ISSUES	- Does the architecture specifically address the E³ family in a manner appropriate to the requirement level stated?	- To the degree practical, have the potential degrading effects of E3 on the corresponding statements of performance been reflected in the presentation of each option?	- As practical, is the projected performance reflected as a function of the EME present? - Have tentative testing/E³ criteria been developed for E³ program planning?	- From the demonstrated performance, have the overall range of E³ performance requirements necessary been identified? - Have acceptable trade-off limitations for E³ designs control measures been established?	- Has the minimum level of information necessary for an adequate degree of monitoring been available? - Has the information available shown that the EDM incorporates the essential E³ control requirements?	- Has the minimum level of information necessary for an adequate degree of monitoring been available? - Has the information available shown that the PDM replicates the E³ control capabilities of the EDM as approved?	- Has information available shown that the PDM is electromagnetically successful?
APPLICABLE KEY DOCUMENT NUMBERS	KDN: 1, 2, 3	KDN: 4, 5, 6, 7, 8	KDN: 9, 10, 11, 12, 13, 14, 15	KDN: 16, 17, 18, 19, 20, 21, 22, 23, 24	KDN: 25, 26, 27, 28, 29, 30, 31, 32	KDN: 33, 34, 35	KDN: 36, 37, 38

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
1	TLWR
2	AOP
3	OTHER

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
4	OTHER
5	TOR
6	DOPG
7	DOP
8	DD 1494c

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
9	OTHER
10	DD1494e
11	OR
12	SSPEC
13	ASPEC
14	TEMP
15	WSPS

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
16	OTHER
17	DD 1494d
18	ESPEC
19	TEMP
20	WSPS
21	WSTS
22	WSCID
23	EMIRPT
24	TERPT

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
25	OTHER
26	DD 1494e
27	PSPEC
28	TEMP
29	WSTS
30	WSCID
31	EMIRPT
32	TERPT

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
33	OTHER
34	EMIRPT
35	TERPT

KEY DOCUMENT NUMBER (KDN)	KEY DOCUMENT
36	OTHER
37	EMIRPT
38	TERPT