



DEPARTMENT OF THE NAVY

NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY TO

5200

Ser 03/001

JAN 30 2003

From: Commander Naval Sea Systems Command

Subj: PROPOSED SCHEDULE FOR HUMAN SYSTEMS INTEGRATION (HSI)
PROGRAM REVIEWS

Ref: (a) NAVSEA NOTICE 5400 of 15 Oct 02

Encl: (1) HSI Program Review Schedule
(2) HSI Program Review Checklist
(3) HSI Program Review Assessment Criteria
(4) HSI Program Review Report Format
(5) DoD 5000 Series Interim Guidance, TAB G - HSI
Procedures
(6) Example Outline for a Human Systems Integration
Plan (HSIP)

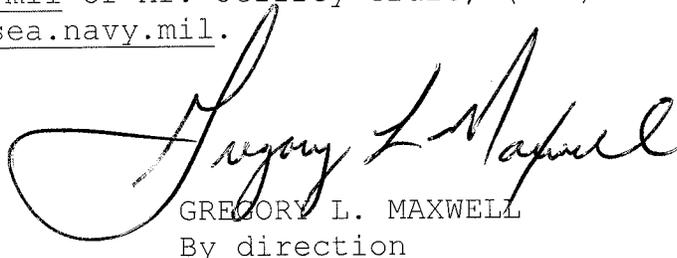
1. Per reference (a), SEA 03 responsibilities include establishing corporate NAVSEA HSI policy and standards, developing HSI certification criteria, human performance metrics and evaluation techniques, and conducting periodic reviews of acquisition program HSI plans and products. This memo (with enclosures) promulgates the 2003 SEA 03 HSI Program Review Schedule.

2. Specifically, enclosure (1) provides the monthly schedule for Program HSI reviews which will commence in March 2003. Enclosure (2) provides a comprehensive SEA 03 checklist that shall be used to prepare for and conduct HSI Program Reviews. Not all HSI elements are applicable nor of equivalent priority to every program. Accordingly, each HSI Program Review will be coordinated and tailored in advance with the respective Program Office. Enclosure (3) provides Program HSI Review assessment criteria. Enclosure (4) provides the report format for findings and recommendations that will be forwarded to the Commander, Program Executive Officers (PEO) and Program Managers within two weeks of the respective review. Enclosure (5) provides DoD 5000 Interim Guidance on HSI procedures. Enclosure (6) provides a sample format for an HSIP.

SUBJ: PROPOSED SCHEDULE FOR HUMAN SYSTEMS INTEGRATION (HSI)
PROGRAM REVIEWS

3. In addition to SEA 03 Staff, Program Managers and their representatives, appropriate OPNAV Program Sponsors including representatives from Human Performance, Manpower, Personnel and Training sponsors will be invited to attend these reviews. Specific date, time and location information for these reviews will be coordinated with the respective program office and published under separate correspondence.

4. PEOs and Program Managers are requested to provide SEA 03 their Point of Contact to help coordinate these program reviews. Please provide name, phone number, and email contact information to Ms. Rhonda Barton, (202) 781-3276, email at bartonrd@navsea.navy.mil or Mr. Jeffrey Grdic, (202) 781-4408, email at grdicjc@navsea.navy.mil.



GREGORY L. MAXWELL
By direction

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SCHEDULE OF HSI PROGRAM REVIEWS

Directorate/PEO/PM Code Program Title	ACAT	Program Manager POC	Phone	HSI Review Date
PEO LMW / PMS EOD VSW MCM Search Classify Map Unmanned Underwater Vehicle (UUV)	AAP	Mr. Chris Deblot	(202) 781-0587	MAR 03
PEO SUB / PMS 398 Sub-Surface Guided Missile Nuclear (SSGN)	ID	CAPT Brian Wegner	(202) 781-1349	APR 03
SEA 05 / SEA 05M Plastics Waste Processor / Shipboard Waste Management	IVT	Ms. Y. Wang	(202) 781-3656	APR 03
PEO SHIPS / PMS 500 & 510 DD (X) - 21 st Century Destroyer Integrated Power System (IPS)	ID	CAPT Chuck Goddard Mr. Mike Collins	(202) 781-2532 (202) 781-0723	APR 03
PEO IWS / PMS 454 Joint Fires Network (JFN) (formerly NFN)	II	CAPT Al Thomas	(202) 781-7365	MAY 03
PEO SUB / PMS 435 TB-29 Thin Line Towed Array (formerly TB-29)	III	CAPT G. Kerr	(202) 781-1556	MAY 03
PEO SHIPS / PMS 317 LPD 17 Amphibious Assault Ship	ID	CAPT S. Stackley	(202) 781-0723	JUN 03
PEO IWS / PEO 472 CIWS Block I / Close-in Weapon System (PHALANX)	IC	CAPT A. Lang	(703) 607-1592 x101	JUN 03
PEO LMW / PMS 210 Airborne Laser Mine Detection System (ALMDS)	II	CAPT V. Jimenez	(202) 781-4376	JUL 03
PEO IWS / PMS 440 AN/WQN-2 Doppler Sonar Velocity Log (DSVL)	IVT	Chris Feldmann	(202) 781-0567	JUL 03
PEO IWS / PMS 461 Ship Self Defense System (SSDS) MK 1/MK 2	II	CAPT J. Graham	(202) 781-2048	Aug 03
PEO SUB / PMS 425 AN/BYG-1(V) Combat Control Subsystem (V1-7) (ECP to CCS MK 2)		CAPT D. Veatch	(202) 781-1182	Aug 03

Directorate/PEO/PM Code Program Title	ACAT	Program Manager POC	Phone	HSI Review Date
PEO LMW / PMS 490 Remote Minehunting System (RMS) AN/WLD-1(V)	II	CAPT A. Briggs	(202) 781-4466	SEP 03
PEO SUB / PMS 425 AN/BSG-1 Weapon Launching System (formerly TLAM-N PLS)	IVT	Paul Hixon	(202) 781-1335	SEP 03
PEO Carriers / PMS 378 CVN 21 Next Generation Nuclear Aircraft Carrier	ID	CAPT D. Berthold	(202) 781-0443	OCT 03
SEA 05 / SEA 05P7 Joint Biological Point Detection System (JBPDS) Block 1	II	Mr. S. Enatsky	(202) 781-0587	OCT 03
PEO IWS / PMS 461 Ship Self Defense System (SSDS) / MK 1 & 2 Advanced Combat Direction System (ACDS) (Block 0/1)	II	CAPT J. Graham	(202) 781-2048	NOV 03
SEA 53 / SEA 53P1 Hydra Communications Systems (AN/SRC-55)	IVT	Jim Carter Mike Lee	(703) 602-6868 x410	NOV 03
PEO SHIPS / PMS 501 Littoral Combat Ship (LCS)	PreMDAP	Mr. Jim Heller	(202) 781-2582	DEC 03
PEO SHIPS / PMS 400C Cruiser Conversion Program		CAPT Ken Spiro	(202) 781-2106	JAN 04
PEO IWS / PMS 471 Evolved Seasparrow Missile (ESSM)	II	Mr. Mike Boland	(703) 607-7200 x181	FEB 04
PEO SHIPS / PMS 377 LHA Replacement New Amphibious Warfare Capability (LHA (R))	PreMDAP	Mr. M. Arnold	(202) 781-0416	FEB 04

HSI PROGRAM REVIEW CHECKLIST

1. Briefly describe the system mission objectives and functional description showing traceability from ORD to program documentation. Identify the predecessor system.
2. Identify next milestone as well as initial operating capability dates.
3. Identify those platforms on which the system will be installed.
4. Describe programmatic requirements:
 - (1) Schedule with milestones,
 - (2) Level of effort estimates,
 - (3) Facility and equipment requirements,
 - (4) Program funding requirements (actual budget vs. requirements; level of resources required to accomplish each HSI Domain (Human Factors Engineering, Manpower, Personnel, Training, Habitability, Personnel Survivability, Environment, Safety and Health (ESH); and Resource Sponsors).
5. Provide the status of the Human Systems Integration Plan. (Reference: Enclosures (5) and (6))
6. Describe the Human Factors Engineering (HFE) objectives sought and analyses conducted, including any functional analyses and task allocation between hardware, software and the human. Address human factors engineering requirements that were established to develop effective human machine interfaces and minimize or eliminate system characteristics that require extensive cognitive, physical or sensory skills; require extensive training or workload; or produce safety/health hazards. Identify HFE objectives achieved. (Reference: NAVSEAINST 3900.8 Human Factors in the Naval Sea Systems Command; MIL-HDBK-46855A Human Engineering Requirements for Military Systems, Equipment, and Facilities; American Society for Testing & Materials (ASTM) 1166-95a - Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities; ASTM F-1337 - Standard Practice for Human Engineering Program Requirements for Ships and Marine Systems, Equipment, and Facilities)

7. Provide the status of the Training Planning Process Methodology (TRPPM) and/or Navy Training System Plan (NTSP). For TRPPM analysis, identify the cost models used for tradeoffs and the MPT results thereof. Indicate whether mission area training requirements have been considered. (Reference: OPNAVINST 1500.76 Navy Training System Requirement, Acquisition and Management, and CNO P-751-2-97 Training Planning Process Methodology (TRPPM) Guide; CNO P-751-3-9-97 Training Planning Process Methodology Manual; CNO P-751-1-9-97 Navy Training Requirements Determination Manual (NTRDM))

8. Describe the manpower requirements and how they were determined including the approach used to provide the most efficient and cost effective mix of manpower and contractor support. Address the workload intensive tasks, process improvements, design options or other initiatives used to reduce manpower and improve the efficiency or effectiveness of support services. (Reference: OPNAVINST 1000.16J Manual of Navy Total Force Manpower Policies and Procedures; OPNAVINST 1500.76 Navy Training System Requirement, Acquisition and Management; CNO P-751-1-9-97 Navy Training Requirements Determination Manual (NTRDM))

9. Describe the personnel requirements and how they were determined. Address current personnel policy and recruitment trends considered to better define the human performance characteristics of the users. (Reference: OPNAVINST 1500.76 Navy Training System Requirement, Acquisition and Management; CNO P-751-1-9-97 Navy Training Requirements Determination Manual (NTRDM))

10. Describe the training concept (as defined in the NTSP format in the Navy Training Requirements Documentation Manual, Chapter 2) and how it was developed, including any new training technology or fleet developed training initiatives incorporated. Include formal courses, training resource requirements (training devices/technical training equipment/curricula development), embedded training capability and required support, impact on mission area training sequence requirements and status of resource funding. (Reference: OPNAVINST 1500.76 Navy Training System Requirement, Acquisition and Management; CNO P-751-1-9-97 Navy Training Requirements Determination Manual (NTRDM))

11. Discuss personnel survivability requirements 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. (Reference: OPNAVINST 9070.1 Standard Specification for Ship Repair & Alteration Program; OPNAVINST 3401.3A Nuclear Survivability of Navy and Marine Corps Systems; OPNAVINST 3541.1E Surface Ship Survivability Training Requirements; MIL-HDBK 297 Introduction to Weapon Effects for Ships (Metrics))

12. Discuss Environmental, Safety and Health (ESH) requirements to include: ESH risks, the PM's strategy for integrating ESH considerations into the systems engineering process, identification of responsibilities, and the method of tracking progress. (Reference: NAVSEA ESH Integration Guide for Program Managers; OPNAVINST 5100.27 Navy Laser Hazards Control Program, NAVSEAINST 8020.6D Navy Weapon System Safety Program, SECNAVINST 5100.10H Department of the Navy Policy for Safety, Mishap Prevention, Occupational Health & Fire Protection Program; OPNAVINST 5100.24 Navy System Safety Program; OPNAVINST 5100.23 Navy Occupational Safety & Health (NAVOSH) Program Manual; NAVSEAINST 5100.12A Requirements for Naval Sea Systems Command System Safety Program for Ships, Shipborne Systems & Equipment; MIL-STD 882 - DoD Standard Practice for System Safety)

13. Describe the habitability requirements for the physical environment, requirements for personnel services (medical and mess), and living conditions (berthing, personnel hygiene, work area), that are necessary for meeting and sustaining system performance, avoiding personnel retention problems and maintaining quality of life. (References: OPNAVINST 9640.1A Shipboard Habitability Program; Shipboard Habitability Design Criteria Manual, T9640-AB-DDT-010/HAB; Shipboard Habitability Practice Manual, T9640-AA-PRO-010/HAB; Habitability Materials List, Rev K, Ltr Ser 03M1/245 6 Nov 96 (available in hard copy only; MIL-STD 1623 Fire Performance Requirements and Approved Specifications for Interior Finish Materials and Furnishings)

14. Describe potential Measures of Effectiveness to be applied throughout the testing and training process to track Sailor learning and performance.

15. For SPMs - Discuss HSI contractual requirements for your program.

For PARMs - Discuss HSI performance requirements as they relate to Part I of your Ship Project Directives (SPDs).

(NOTE: Reference material is available on Inside NAVSEA City, under Tools and Apps, Specs and Standards (Information Handling System (IHS)). You can use IHS or ASSIST Quick Search (<http://assist.daps.dla.mil/quicksearch/>) links from that page. References in paragraphs 7-10 can also be found on the Office of Training Technology Website in their Reference Library link at: <http://www.ott.navy.mil>. OPNAV & SECNAV Instructions can be found at the Naval Electronic Directives System (NEDS) at: <http://neds.nebt.daps.mil/directives/dirindex.html>. References will also be available on the NAVSEA Training Acquisition (SEATRACQ) website at <https://seatracq.navsea.navy.mil>).

HUMAN SYSTEMS INTEGRATION (HSI) ASSESSMENT CRITERIA

Programs will be HSI assessed utilizing the criteria below.

GREEN: (Ready to Proceed)

A program is HSI ready to proceed when there are no major issues to be resolved or actions required and there are commitments and realistic completion dates set for all other important matters affecting supportability or life cycle affordability.

YELLOW: (Conditionally Ready to Proceed)

A program is conditionally ready to proceed when there are major issues or actions outstanding to be resolved. The program may proceed, provided there is a plan, resources, and schedule to address and resolve those issues and actions subsequent to a milestone decision without unduly compromising supportability, readiness or life cycle cost.

RED: (Not Ready to Proceed)

A program is not ready to proceed when there are major issues or actions outstanding which require resolution before a Program Decision Meeting or when realistic resources, plans or commitments are not in place to resolve major issues or actions that are to be addressed after the Program Decision Meeting. Examples are:

- HSI planning and execution are inadequate to ensure delivery of fully supportable systems.
- Accomplishments do not satisfy the intent of the Department of Defense or Department of the Navy Policy.
- Valid support requirements are not fully funded and there are no approved work-arounds established for the requirements.

**SEA 03 HSI Program Review Report
Findings and Recommendations**

Program Title:
Program Manager:
HSI POC:
Program Summary: (Brief description of program being assessed)

SEA 03 has reviewed your Program and the following comments relative to each HSI Domain are provided.

Overall HSI Planning: (Red, Yellow, Green)
Overall HSI Execution: (Red, Yellow Green)

HSI Domains Comments:

Overall HSI: (Red, Yellow, Green) (A brief assessment of the integration of all HSI elements)

Program Funding Profile: (Red, Yellow, Green) (A brief assessment of the HSI Program funding requirements vs the actual budget amounts.)

Human Factors Engineering: (Red, Yellow, Green) (A brief assessment of HFE.)

Manpower: (Red, Yellow, Green) (A brief assessment of the manpower concept.)

Personnel: (Red, Yellow, Green) (A brief assessment of the personnel concept.)

Training: (Red, Yellow, Green) (A brief assessment of the training concept.)

Personnel Survivability: (Red, Yellow, Green) (A brief assessment of the survivability concept.)

Environment, Safety and Health (ESH): (Red, Yellow, Green) (A brief assessment of the ESH concept)

Habitability: (Red, Yellow, Green) (A brief assessment of the habitability concept.)

Findings:

Issue:
Discussion:
Recommended Action:

TAB G of Attachment 2
Operation of the Defense Acquisition System

HUMAN SYSTEMS INTEGRATION (HSI) PROGRAM

General: The PM shall have a comprehensive strategy for HSI in place early in the acquisition process to minimize ownership costs and improve performance by ensuring that the system is built to accommodate the human performance characteristics of the user population that will operate, maintain, and support the system.

Human Factors Engineering: The PM shall take steps to ensure human factors engineering/cognitive engineering is employed during systems engineering for the life of the project to provide for effective human-machine interfaces and to meet HSI requirements. Where practicable and cost effective, system designs shall minimize or eliminate system characteristics that require excessive cognitive, physical, or sensory skills; entail extensive training or workload-intensive tasks; result in mission-critical errors; or product safety or health hazards.

Personnel: The PM shall work with the personnel community to define the human performance characteristics of the user population based on the system description, functional analysis of required knowledge, skills and abilities, projected characteristics of target occupational specialties, and recruitment and retention trends. To the extent possible, systems shall not require special cognitive, physical, or sensory skills beyond that found in the specified user population. For those programs that require skills requirements that exceed the knowledge, skills, and abilities of current military occupational specialties or that require additional skills indicators or hard-to-fill military occupational specialties, the PM shall consult with personnel communities to identify readiness, PERSTEMPO, and funding issues that impact program execution.

Habitability: The PM shall work with habitability representatives to establish requirements for the physical environment (e.g., adequate space and temperature control) and, if appropriate, requirements for personnel services (e.g., medical and mess) and living conditions (e.g., berthing and

personal hygiene) for conditions that have a direct impact on meeting or sustaining system performance or that have such an adverse impact on quality of life and morale that recruitment or retention is degraded. If appropriate, adequate space and facilities for physical conditioning shall be included.

Manpower: In advance of contracting for operational support services, the PM shall work with the manpower community to determine the most efficient and cost-effective mix of DoD manpower and contract support. As a part of this process, the PM shall consider use of inter-Service and intra-Governmental support (DoD Instruction 4000.19). Appropriate analysis shall also be conducted to identify appropriate tasks for automation vs. human responsibility and the resultant cost/risk trade-offs. Workload analysis shall be completed for all billets identified.

Training: The PM shall work with the training community to develop options for individual, collective, and joint training for operators, maintainers, and support personnel and, where appropriate, base training decisions on training effectiveness evaluations. The PM shall address major elements of the training system described in DoD Directive 1430.13, and place special emphasis on options that enhance user capabilities, maintain skill proficiencies, and reduce individual and collective training costs. The PM shall develop training system plans to maximize use of new learning techniques, simulation technology, embedded training, and instrumentation systems that provide anytime, anyplace training and reduce the demand on the training establishment. Where possible, the PM shall maximize use of simulation-supported embedded training and the training systems shall fully support and mirror the interoperability of the operational system. For training programs that require training infrastructure modifications, the PM shall identify technical, schedule, and funding issues that impact program execution. Ship systems shall also support training needs for individual Sailor personal professional development.

Environment, Safety and Health (ESH): As part of risk reduction, the PM shall prevent ESH hazards, where possible, and shall manage ESH hazards where they cannot be avoided. The support strategy shall incorporate a Programmatic ESH Evaluation (PESHE), including ESH risks, a strategy for integrating ESH considerations into the systems engineering process, identification of ESH responsibilities, a method for tracking

progress, and a compliance schedule for National Environmental Policy Act (NEPA) (42 U.S.C. 4321-4370d and Executive Order 12114). During system design, the PM shall document hazardous materials used in the system and plan for their demilitarization and disposal.

Survivability. 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. The PM shall address special equipment or gear needed to sustain crew operations in the operational environment.

Example Outline for a Human Systems Integration Plan (HSIP)

1. Background/System Information
 - a. Program Summary
 - b. Acquisition Strategy
 - c. Program Schedule
 - d. Target Users (identify operators, maintainers, and supporters of system)
 - e. Guidance
 - f. Constraints

2. Issues - Identify critical human system factors that have a significant impact on readiness, life cycle cost, schedule, or performance. It should include potential cost, schedule and design risks and trade-offs that concern human systems integration factors and plans to manage and reduce program risks. This analysis is based on high-driver, predecessor data:
 - a. Each HSI issue or opportunity
 - b. The impact of that issue or opportunity
 - c. What has been done
 - d. Potential solution(s) that have not been attempted
 - e. Proponent Agency

As issues are resolved, data on HSI costs (analyses, support) and benefit (cost savings and cost avoidance) should be captured.

3. Human System Integration Program
 - a) Tasks to be performed
 - b) HSI milestones
 - c) Level of effort
 - d) Methods to be used
 - e) Design concepts to be used
 - f) Test & Evaluation program
 - g) Risk management
 - h) Identify potential cost, schedule, design, and performance risks that result from design aspects of HSI
 - i) Quantify such risks and their impacts on cost, schedule, and performance
 - j) Evaluate and define the sensitivity of such risks to HE design
 - k) Identify alternative solutions to moderate- and high-risk HSI problems and define their risks
Take actions to avoid, minimize, control, or accept each HSI risk

4. Human Factors Engineering - Describe how human factors engineering will be applied to the system design effort.
5. Manpower - Discuss manpower impacts of the new system as compared to its predecessor or comparable system(s) and state the sources of manpower resources for the new system. Discuss the process(es) used to generate manpower requirements for systems which have no predecessor or comparable equivalents.
6. Personnel - Discuss requirements for new occupational specialties requirements for highly qualified personnel or "hard-to-fill" military and civilian occupations, and how these personnel requirements will be met. Discuss how personnel requirements are/were coordinated with manpower requirements
7. Training - Summarize training design efforts and planning for implementation of training program. Map training design efforts to each major system/subsystem in the acquisition product (i.e., ship, system, hardware, software, etc.).
8. System Safety - Discuss efforts taken to identify and eliminate or minimize hazardous conditions in the acquisition product. Summarize how safety and health hazard lessons learned are being applied to the new system.
9. Sailor Survivability- Discuss efforts taken to identify and resolve personnel survivability issues concerning the acquisition product (i.e., efforts to mitigate nuclear, biological, radiological and blast effects on personnel and manned systems).
10. Habitability Requirements - Discuss efforts to identify and accommodate mixed gender users' capabilities, design space and service requirements to meet government and industry standards and incorporate growth considerations in the acquisition product.