



DEPARTMENT OF THE NAVY

BOARD OF INSPECTION AND SURVEY
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NORFOLK, VA 23521-3295

INSURVINST 4730.21D
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INSURV INSTRUCTION 4730.21D

From: President, Board of Inspection and Survey

Subj: AREA ANTI-AIR WARFARE (AAW), AND SELF-DEFENSE (SD) DETECT-TO-ENGAGE (DTE) DEMONSTRATIONS, AND LONG RANGE AIR SEARCH RADAR PERFORMANCE DEMONSTRATIONS

Ref: (a) FXP-2

Encl: (1) Specific systems used in Area AAW/SD DTE evaluations by ship class

1. Purpose. To establish PRESINSURV policy and standards for evaluating a ship's long range air search radar performance and the ability of installed SD systems and, if applicable, Area AAW systems to detect, acquire, track, assign and engage air targets. These capabilities are evaluated using long range air search radar performance demonstrations, Self-Defense detect to engage demonstrations and, if applicable, Area AAW detect to engage demonstrations. These demonstrations are designed to test equipment parameters and are not to be construed as tactical or training demonstrations.

2. Cancellation. INSURVINST 4730.21C.

3. Discussions. The DTE and long range air search radar performance demonstrations are evaluations of air warfare equipment in a clear environment using live aircraft services. The flight profiles, including high and low elevation runs, are contained in reference (a). Air warfare equipment to be demonstrated includes:

a. Air search radars, including automatic detection and tracking capabilities.

b. Fire control radars.

c. Weapons direction equipment and tactical data system to weapons system interfaces.

d. Missile launching systems.

e. All installed automatic gun systems.

4. Policy

a. Area AAW DTE demonstrations will be conducted only in medium range and long range Standard Missile equipped ships.

b. SD DTE demonstrations will be conducted in all ships equipped with self-defense missile systems, gun systems, or CIWS.

c. All ships possessing a long range air search radar will conduct a maximum range detection demonstration either in conjunction with Communication, TACAN and IFF long haul demonstrations or Area AAW/SD DTE. However, discrepancies observed in the long range detection area will not affect the SD DTE evaluation.

d. The inspection QUICKLOOK message will address significant deviation by target aircraft from DTE flight profiles.

5. Requirements. The ship is required to detect, track and perform simulated engagements with all layers of Area AAW and Self-Defense weapons systems. The most fully automated configuration (i.e. MK 92 FCS (TR AUTO), MK 74 FCS (QR AUTO), AEGIS (AUTO SPECIAL), NSSMS (TAS AUTO/SEA SPARROW AUTO), RAM (SLQ-32 Interface enabled)) designed into the combat systems, consistent with demonstrating the ability to achieve maximum engagement ranges, will be used during the Area AAW and SD DTE demonstrations. Exercise target aircraft providing services for Rolling Air Frame Missile (RAM) equipped ships must be configured with an external transmitter capable of stimulating the SLQ-32 and RAM systems.

Note: Pre-fire checks on gun and missile systems must be satisfactorily completed prior to demonstrations.

6. Long Range Air Search Radar Performance Procedures

a. Target aircraft shall close the test ship starting at a position of approximately 225NM/30KFT MSL from the test ship.

b. Air search radars (2D and 3D), including TAS, shall detect and track the target in their most automatic mode. The initial detection range will be recorded.

7. Area AAW Detect-to-Engage Procedures

a. Target aircraft shall close the test ship starting at a position of approximately 225NM/30KFT MSL from the test ship.

b. The Combat Direction System will demonstrate its most automatic mode of track management and assignment to missile system.

c. One missile fire control system director/illuminator/radar shall acquire, track, assign and simulate engagement of the target aircraft as close as possible to maximum effective missile range. Following the initial simulated intercept all other remaining missile system components will be tested in like manner as the target aircraft continues inbound.

d. All missile launching systems shall successfully simulate missile launch during target engagement when ordered. Ship maneuvering to unmask batteries may be required.

8. Self Defense Detect-to-Engage Procedures

a. Gun and NSSMS/RAM Phase: Upon completion of the Area AAW DTE and/or Long Range Air Search Radar Performance demonstration, the aircraft shall continue inbound (or re-position) and at a range in excess of 40 NM from the ship, descend to 300 feet MSL and close directly at the ship. This profile shall be repeated for each SD missile and gun system. NSSMS ships will be configured to support TAS AUTO/NSSMS AUTO with no live munitions loaded.

(1) The Target Acquisition System (TAS) shall detect, track and assign the target at a range sufficient to allow for a maximum effective missile range intercept.

(2) The missile fire control system(s) shall acquire and track the target at a range sufficient to allow for a maximum missile range intercept.

(3) The missile launching system(s) shall train, elevate and simulate missile launch when ordered. RAM equipped ships will utilize a Canister Round Simulator (CRS), procured from NSWC PHD, to complete the firing simulation phase.

(4) The gun fire control system(s) shall acquire and track the target at a range sufficient to allow for gun engagement at maximum effective gun range. The gun shall train, elevate and simulate firing (including cycling the ammunition loading system) when ordered.

b. CIWS Phase: Only the first valid profile for each CIWS mount will be used in the overall characterization of the SD DTE demonstration. CIWS shall be configured as follows for the initial run:

- (1) Gun ARMED
- (2) HOLD FIRE Deselected
- (3) SECTOR HOLDBACK TOOL Removed
- (4) FIRING CIRCUIT Open
- (5) System in HIGH POWER
- (6) PASS Loaded
- (7) Magazine Loaded With Dummy Ammunition
- * (8) AUTO POWER Off (For AEGIS AUTO POWER On)
- * (9) RCP Control
- * (10) AAW AUTO Selected

c. For ships with Multiple Weapons Coordination (MWC) capability, CIWS in RCP Control/AAW AUTO with MWC selected will be demonstrated in an area of overlapping coverage.

* Note: AEGIS CIWS mounts will be configured as RCP control/AIR READY with AUTO DESIG ENABLE selected and PHALANX DESIG TEST enabled at the MSS console for one run, and with AAW AUTO selected for a second run.

9. Long Range Air Search Radar Performance Evaluation

a. Satisfactory. The target was successfully detected and tracked by the air search radar(s) at a minimum of 90 percent of the maximum Integrated Radar Environmental Prediction System (IREPS) predicted range for a one square meter target, at a 90 percent probability of detection. Detection and tracking was done in the radars most automatic mode.

b. Degraded. The target was not successfully detected and tracked by the air search radar(s) at a minimum of 90 percent of the maximum IREPS predicted range for a one square meter target, at a 90 percent probability of detection, and/or the radar(s) could not be demonstrated in their most automatic mode.

c. Unsatisfactory. The target was not successfully detected and tracked by the radar(s) in any mode.

10. Area AAW DTE Evaluation. (Enclosure (1) provides the specific systems considered in an Area AAW DTE demonstration evaluation.)

a. Satisfactory. The target was successfully detected by the air search radar(s) at a minimum of 90 percent of maximum IREPS predicted range and engaged at a minimum of 90 percent of maximum missile range by at least one system. All remaining illuminators/directors/launchers demonstrated the ability to successfully engage the target and there was no indication that they were significantly limited in their ability to engage at expected ranges.

b. Degraded. The target was successfully detected by the air search radar(s) at less than 90 percent of the IREPS predicted range, or was successfully engaged with some, but not all director/illuminator/launchers, or the first simulated engagement occurred at less than 90 percent of maximum missile range.

c. Unsatisfactory. The target was not successfully engaged by any Area AAW systems.

11. Self-Defense DTE Evaluation. (Enclosure (1) provides the specific system considered in a SD DTE demonstration evaluation.)

a. Satisfactory: The target was successfully engaged with all self-defense weapons systems at a minimum of 90 percent of maximum range.

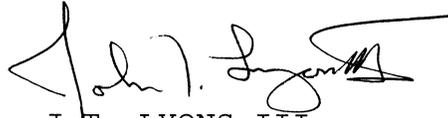
b. Degraded: The target was successfully engaged with some, but not all self-defense weapons systems, or some, but not all director/illuminator/launchers were operational, or engagement(s) occurred at less than 90 percent of maximum effective missile range or less than 90 percent of maximum effective gun range.

c. Unsatisfactory: The target was not successfully engaged by any self-defense system.

12. Additional events. The following equipment shall be demonstrated in conjunction with these demonstrations, but will not be included in their overall evaluation.

- (a) TACAN
- (b) IFF (all radars)
- (c) Link 4A/11/16 (if aircraft capable)
- (d) UHF long range communications

13. The Commanding Officer of the unit remains completely responsible for the safe conduct of these demonstrations. At no time will the Commanding Officer's Weapons Safety Posture be compromised. Nothing is more important than safety of equipment and personnel.



J.T. LYONS III

Distribution:

CNO (N85, N86, N88)
COMNAVSEASYS COM (SEA-91, 03)
PEO CARRIERS WASHINGTON DC
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PEO TSC
DRPM AEGIS
COMNAVSURFLANT (N3)
COMNAVSURFPAC (N3)
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SUPSHIP BATH
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SUPSHIP PASCAGOULA
SUPSHIP SAN DIEGO
SUPSHIP NEWPORT NEWS
NSWC PORT HUENEME
CO, INSURVLANT
CO, INSURVPAC
PRESINSURV (01, 03, 01A, File)

SPECIFIC SYSTEMS USED IN AREA AAW/SD DTE
EVALUATIONS BY SHIP CLASS

This enclosure defines systems considered in determining the Area AAW/SD DTE demonstration evaluations.

FFG-7 Class

<u>System</u>	<u>Subsystem</u>	<u>Area AAW DTE</u>	<u>SD DTE</u>
MK 92 FCS	STIR	Yes	No
	CAS (upper)	Yes	No
	CAS (lower)	Yes	No
Mk 13 GMLS		Yes	No
SPS-49 radar			
	(reduced sensitivity)	Yes	No
	(inop)	Yes	No
76 mm gun		No	Yes
MK 15 PHALANX		No	Yes

DDG-51 Class

<u>System</u>	<u>Area AAW DTE</u>	<u>SD DTE</u>
Mk 99 FCS	Yes	No
Mk 41 GMLS	Yes	No
SPY-1D		
	(reduced sensitivity)	Yes
	(inop)	Yes
Mk 34 GFCS	No	Yes
MK 15 PHALANX	No	Yes

CG-47 Class

<u>System</u>	<u>Area AAW DTE</u>	<u>SD DTE</u>
Mk 99 FCS	Yes	No
Mk 26/41 GMLS	Yes	No
SPY-1A/B		
	(reduced sensitivity)	Yes
	(inop)	Yes
Mk 86 GFCS	No	Yes
SPS-49		
	(reduced sensitivity)	Yes
	(inop)	Yes
MK 15 PHALANX	No	Yes

encl (1)

FOR SHIPS ONLY HAVING SD SYSTEMS

<u>SYSTEM</u>	<u>SD DTE</u>
AN/SPS-40	No
AN/SPS-49	No
AN/SPS-48	No
Ship Self Defense System	Yes
MK 57 NSSMS DUAL DIR	Yes
MK 15 PHALANX	Yes
MK 31/0 GMWS RAM	Yes
AN/SPQ-9B	Yes
MK23 TAS	Yes
AIMS MK XII IFF SYSTEM	No