Part VI

Performance Standards for Older Radar Equipment

51. Application—These performance standards apply to all ships' radar equipment installed before 1 September 1984.

52. General—The radar equipment shall provide an indication in relation to the ship of the position of other surface craft and obstructions and of buoys, shorelines and navigational marks in a manner which will assist in avoiding collision and in navigation.

53. It shall comply with the minimum requirements in the following clauses:

54. Range Performance—The operational requirement under normal propagation conditions, when the radar aerial is mounted at a height of 15 metres above sea level is that the equipment shall give a clear indication of:

(1) Coastlines

(a) At 20 nautical miles when the ground rises to 60 metres.

(b) At 7 nautical miles when the ground rises to 6 metres.

(2) Surface Objects

(a) At 7 nautical miles a ship of 5,000 gross tonnage, whatever her aspect.

(b) At 3 nautical miles a small vessel of length 10 metres.

(c) At 2 nautical miles an object such as a navigational buoy having an effective echoing area of approximately 10 square metres.

55. Minimum range—The surface objects specified in clause (54)(2) of this performance standard shall be clearly displayed from a minimum range of 50 metres up to a range of one nautical mile, without adjustment of controls other than the range selected.

56. Display—(1) The equipment shall provide a relative plan display of not less than 180mm effective diameter.

(2) The equipment shall be provided with at least five ranges, the smallest of which is not more than one nautical mile and the greatest of which is not less than 24 nautical miles. Additional ranges may be provided.

(3) Positive indication shall be given of the range of view displayed and the interval between range rings.

57. Range measurement—(1) The primary means provided for range measurement shall be fixed electronic range rings. There shall be at least four range rings displayed on each of the ranges mentioned in clause 56(2) of this performance standard, except that on ranges below one nautical mile range rings shall be displayed at intervals of 1/4 nautical mile.

(2) Fixed range rings shall enable the range of an object, whose echo lies on a range ring, to be measured with an error not exceeding 1.5 per cent of the maximum range of the scale in use, or 70 metres, whichever is the greater.

(3) Any additional means of measuring range shall have an error not exceeding 2.5 per cent of the maximum range of the displayed scale in use, or 120 metres, whichever is the greater.

58. Heading Indicator—(1) The heading of the ship shall be indicated by a line on the display with a maximum error not greater than $\pm 1°$. The thickness of the displayed heading line shall not be greater than $\frac{1}{2}°$.

(2) Provision shall be made to switch off the heading indicator by a device which cannot be left in the "heading marker off" position.

59. Bearing measurement—(1) Provision shall be made to obtain quickly the bearing of any object whose echo appears on the display.

(2) The means provided for obtaining bearings shall enable the bearing of a target whose echo appears at the edge of the display to be measured with an accuracy of $\pm 1°$ or better.

60. Discrimination—(1) The equipment shall display as separate indications, on the shortest range scale provided, two objects on the same azimuth separated by not more than 50 metres in range.

(2) The equipment shall display as separate indications two objects at the same range separated by not more than 2.5° in azimuth.

(3) The equipment shall be designed to avoid, as far as is practicable, the display of spurious echoes.

61. Roll—The performance of the equipment shall be such that when the ship is rolling $\pm 10°$ the echoes of targets remain visible on the display.

62. Scan—The scan shall be continuous and automatic through 360 degrees of azimuth, the target data rate shall be at least 12 per minute and the equipment shall operate satisfactorily in relative wind speeds of up to 100 knots.

63. Azimuth stabilisation—(1) Means shall be provided to enable the display to be stabilised in azimuth by a transmitting compass. The accuracy of alignment with the compass transmission shall be within $\frac{1}{2}°$ with a compass rotation rate of 2 r.p.m.

(2) The equipment shall operate satisfactorily for relative bearings when the compass control is inoperative or not fitted.

64. Performance check—Means shall be available, while the equipment is used operationally, to determine readily a significant drop in performance relative to a calibration standard established at the time of installation.

65. Anti-clutter devices—Means shall be provided to minimise the display of unwanted responses from precipitation and the sea.

66. Operation—(1) The equipment shall be capable of being switched on and operated from the main display position.

(2) Operational controls shall be accessible and easy to identify and use.

(3) After switching on from cold, the equipment shall become fully operational within 4 minutes.

(4) A standby condition shall be provided from which the equipment can be brought to a fully operational condition within one minute.

67. Interference—After installation and adjustment on board, the bearing accuracy as prescribed in clause 59 of this performance standard shall be maintained without further adjustment irrespective of the variation of external magnetic fields.

68. Sea or Ground Stabilisation—Sea or ground stabilisation, if provided, shall not degrade the accuracy of the display below the requirements of this performance standard, and the view ahead on the display shall not be unduly restricted by the use of this facility.

69. The aerial system shall be installed in such a manner that the efficiency of the display is not impaired by the close proximity of the aerial to other objects. In particular, blind sectors in the forward direction should be avoided.

Part VII Performance Standards for Automatic Radar Plotting Aids (ARPA)

70. General—(1) Automatic radar plotting aids (ARPA) shall, in order to improve the standard of collision avoidance at sea:

(a) reduce the work-load of observers by enabling them to automatically obtain information so that they can perform as well with multiple targets as they can by manually plotting a single target;

(b) provide continuous, accurate and rapid situation evaluation.

(2) In addition to the general requirements for electronic navigational aids the ARPA shall comply with the following minimum performance standards.