71. Definitions—Definitions of terms used in this Part VII of these performance standards are:

Relative course means—the direction of motion of a target related to own ship as deduced from a number of measurements of its range and bearing on the radar, expressed as an angular distance from north.

Relative speed means—the speed of a target related to own ship, as deduced from a number of measurements of its range and bearing on the radar.

True course means—the apparent heading of a target obtained by the vectorial combination of the target's relative motion and own ship's motion*, expressed as an angular distance from north.

True speed means—the speed of a target obtained by the vectorial combination of its relative motion and own ship's motion*.

Bearing means—the direction of one terrestrial point from another, expressed as an —distance from north.

* For the purpose of these definitions there is no need to distinguish between sea and ground stabilisation.

Relative motion display means—the position of own ship on such a display remains fixed. True motion display means—the position of own ship on such a display moves in accordance with its own motion.

Azimuth stabilisation means—own ship's compass information is fed to the display so that echoes of targets on the display will not be caused to smear by changes of own ship's heading.

—north-up—the line connecting the centre with the top of the display is north.

—head-up—the line connecting the centre with the top of the display is own ship's heading.

—course-up—an intended course can be set to the line connecting the centre with the top of the display.

Heading means—the direction in which the bows of a vessel are pointing, expressed as an angular distance from north.

Target's predicted motion means—the indication on the display of a linear extrapolation into the future of a target's motion, based on measurements of the target's range and bearing on the radar in the recent past.

Target's motion trend means—an early indication of the target's predicted motion.

Radar plotting means—the whole process of target detection, tracking, calculation of parameters and display of information.

Detection means—the recognition of the presence of a target.

Acquisition means—the selection of those targets requiring a tracking procedure and the initiation of their tracking.

Tracking means—the process of observing the sequential changes in the position of a target, to establish its motion.

Display means—the plan position presentation of ARPA data with radar data.

Manual means—relating to an activity which a radar observer performs, possibly with assistance from a machine. Automatic means relating to an activity which is performed wholly by a machine.

72. Detection—Where a separate facility is provided for detection of targets, other than by the radar observer, it shall have a performance not inferior to that which could be obtained by the use of the radar display.

73. Acquisition—(1) Target acquisition may be manual or automatic. However, there shall always be a facility to provide for manual acquisition and cancellation. ARPA with automatic acquisition shall have a facility to suppress acquisition in certain areas. On any range scale where acquisition is suppressed over a certain area, the area of acquisition shall be indicated on the display.

(2) Automatic or manual acquisition shall have a performance not inferior to that which could be obtained by the user of the radar display.

74. Tracking—(1) The ARPA shall be able to automatically track, process, simultaneously display and continuously update the information on at least:

(a) 20 targets, if automatic acquisition is provided, whether automatically or manually acquired;

(b) 10 targets, if only manual acquisition is provided.

(2) If automatic acquisition is provided, description of the criteria of selection of targets for tracking shall be provided to the user. If the ARPA does not track all targets visible on the display, targets which are being tracked shall be clearly indicated on the display. The reliability of tracking shall not be less than that obtainable using manual recordings of successive target positions obtained from the radar display.

(3) Provided the target is not subject to target swop, the ARPA shall continue to track an acquired target which is clearly distinguishable on the display for 5 out of 10 consecutive scans.

(4) The possibility of tracking errors, including target swop, shall be minimised by ARPA design. A qualitative description of the effects of error sources on the automatic tracking and corresponding errors shall be provided to the user, including the effects of low signal-to-noise and low signal-to-clutter ratios caused by sea returns, rain, snow, low clouds and non-synchronous emissions.

(5) The ARPA shall be able to display on request at least four equally time-spaced past positions of any targets being tracked over a period of at least eight minutes.

75. Display—(1) The display may be a separate or integral part of the ship's radar. However, the ARPA display shall include all the data required to be provided by a radar display in accordance with the performance standards for navigational radar equipment adopted by IMO.

(2) The design shall be such that any malfunction of ARPA parts producing data additional to information to be produced by the radar as required by the performance standards for navigational equipment adopted by IMO shall not affect the integrity of the basic radar presentation.

(3) The display on which ARPA information is presented shall have an effective diameter of at least 340mm.

(4) The ARPA facilities shall be available on at least the following range scales:

(a) 12 or 16 nautical miles;

(b) 3 or 4 nautical miles.

(5) There shall be a positive indication of the range scale in use.

(6) The ARPA shall be capable of operating with a relative motion display with "north-up" and either "head-up" or "course-up" azimuth stabilisation. In addition, the ARPA may also provide for a true motion display. If true motion is provided, the operator shall be able to select for his display either true or relative motion. There shall be a positive indication of the display mode and orientation in use.

(7) The course and speed information generated by the ARPA for acquired targets shall be displayed in a vector or graphic form which clearly indicates the target's predicted motion. In this regard:

(a) ARPA presenting predicted information in vector form only shall have the option of both true and relative vectors;

(b) an ARPA which is capable of presenting target course and speed information in graphic form shall also, on request, provide the target's true and/or relative vector;

(c) vectors displayed shall either be time-adjustable or have a fixed time-scale;