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INLAND TRANSPORT COMMITTEE

Principal Working Party on
Inland Water Transport

Working Party on the Standardization
of Technical and Safety Requirements
in Inland Navigation
(Sixteenth session, 10-12 June 1998,
agenda item 5)

RECOMMENDATIONS ON TECHNICAL REQUIREMENTS FOR ELECTRONIC
NAVIGATIONAL SHIPBORNE EQUIPMENT AND ITS INSTALLATION ON
BOARD SHIPS, INCLUDING, IN PARTICULAR, RADAR INSTALLATIONS
AND RATE-OF-TURN INDICATORS

Transmitted by the Government of the Russian Federation

Note: During the Working Party's fourteenth session, the delegation of the Russian Federation offered to submit to the Working Party, in concise form, draft technical requirements for radars prepared on the basis of a comparative analysis of the technical requirements of CCNR and the Danube Commission (TRANS/SC.3/WP.3/28, para. 32).

The draft technical requirements transmitted by the Government of the Russian Federation are reproduced below.

Requirements for the equipping of vessels with, and the
main technical specifications for radar stations

[1. The following must be equipped with radar stations:

All vessels of class "M" (Lakes Ladoga and Onega);

Vessels of class "O" (navigation region I) with a length of more than 25 m:

Vessels of class "P" (navigation region I) at the boatmaster's discretion.]

Radar stations for use on inland waterway vessels must be approved by the competent authorities and satisfy the following technical requirements:

Minimum range of detection, m	15
Maximum range of detection (at height of installation 10 m), m	Shore 60 m high: 37,000 (for cm-band radar); 14,000 (for mm-band radar)
Distance resolution, m	15 (at scales 0.5 - 1.6 km); 1% of the scale value at other scales
Angular resolution	1°; antennae with a resolution of not more than 3° may be installed on vessels of 1,600 register tons
Accuracy of measurement: Range Bearings	Variable range circles: 1% Fixed range circles: not more than 10 m at scales 0.5 - 2.0 km) ± 1°
Lubber line: Width Deviation	 0.5° 0.5°
Effective diameter of tube	Vessels from 500 to 1,600 register tons: 180 mm Vessels of over 1,600 register tons: 270 mm
Range scales	0.5, 1, 1.6, 2, 3.2, 4, 8, 16, 32 km. Not less than 4 fixed range circles within each scale.

Off-centring	¼-⅓ of the effective diameter of the image.
Reduction of sea and rain clutter	Manual control; automatic control optional.
Bearing facilities	Electronic, capable of taking bearings in 5 secs, permissible error 1°, or mechanical, rotatable through 360°
Emission frequency	9 GHz (3.2 cm) or 33.2 GHz (9 mm); from 2015, only 33.2 GHz (9 mm) ¹
Warm-up time, mins	4
Minimum antenna speed, rpm	18; the antenna must be capable of operating at a relative wind speed of 50 m/sec
Reduction of interference from other radar equipment. Compatibility with radar beacons	Signals from radar beacons in accordance with IMO resolution A.423 (XI) must be clearly displayed on the screen even when the wave and atmospheric precipitation clutter suppression (FTC) is switched off.

¹The following points may be made about mm-band radars by comparison with the cm-band radars in widespread use on inland waterways:

Reducing the wavelength without altering the antenna dimensions enhances the resolution and so makes the image more informative and accurate. In the mm band, the echo takes forms that make it possible to determine the linear dimensions and aspect angle of the oncoming (overtaking) vessel. In addition, the mm band offers more reliable detection of small vessels and buoyage, since the enhanced resolution means that their images are more strongly contrasted against the background of the water surface. The effect of these advantages of the mm band is to increase the safety of navigation in poor visibility near shorelines, in the crowded conditions on small waterways and on waterways with heavy traffic.

It is a well-known fact that the shorter the wavelength, the more a radar's detection range depends on weather conditions (the intensity of rain- or snow-fall or the thickness of fog).

In the case of the 9 mm band used for navigation, precipitation and fog are rarely heavy enough to have any substantial adverse effect on the detection range.

2. It is recommended that the radar indicator be installed to the right of the navigation station or on the fore-and-aft line near the forward wall of the wheelhouse.

The auxiliary indicator, if any, must be installed near the place where the course is plotted. The azimuthal orientation of the radar picture shall be in accordance with the normal situation of the surroundings. Clamps and adjustable consoles shall be so constructed that they can be locked in any position.

Cordless remote controls are not permitted.

The distance from the rudder controls on the boatmaster's control panel to the radar indicator shall not exceed 800 mm.

On pushers, it must be possible when navigating by radar with a push-tow to install the radar indicator on the fore-and-aft line near the forward wall. It must be possible to lower and/or raise and/or move the indicator along the forward wall when it is no longer needed.

3. The radar antenna must be installed so as to ensure that there is the best possible coverage on the indicator screen along the vessel's course, with no dead sectors within 5° to port or starboard, and that the coverage of the horizon is, if possible, unobstructed by superstructure, piping or other structures. The antenna must be installed sufficiently high up to ensure that the high-frequency radiation flux density on open decks where there may be people does not exceed the permitted level.

After the angular error due to installation has been corrected and the radar station has been switched on, the deviation of the lubber line from the fore-and-aft line must not exceed 1°.
