IALA RECOMMENDATION (NORMATIVE)

R0101
MARINE RADAR BEACONS (RACONS)

Edition 3.0

December 2025

urn:mrn:iala:pub:r0101:ed3.0

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International Organization for Marine Aids to Navigation

DOCUMENT REVISION

Revisions to this document are to be noted in the table prior to the issue of a revised document.

Date	Details	Approvals
January 1995	1st issue	
December 2000	Edition 1.1	
September 2004	Edition 2.0 General Revision, including updating information and clarification of terms. Discussions underway at IMO and ITU on S-band radars; concern over the future of Racons.	
December 2020	Edition 2.1 Editorial corrections.	Council 72
December 2025	Edition 3.0 Updated to new format. Moved some text to revised R1046 on Racon strategy. Updated and clarified the Technical Parameters Table.	Council 03

THE COUNCIL

RECALLING the aim and objectives of the International Organization for Marine Aids to Navigation (the Organization hereafter) with respect to the improvement and harmonization of Marine Aids to Navigation worldwide for the benefit of the maritime community and the protection of the marine environment;

RECALLING FURTHER Article 8 of the Convention of the Organization regarding the responsibilities of the Council;

NOTING that the International Maritime Organization, in Assembly Resolution A.615(15) on Radar Beacons and Transponders, has recommended operational standards for radar beacons;

NOTING ALSO that the International Maritime Organization is developing revised performance standards for radars;

NOTING FURTHER that the International Telecommunication Union in ITU-R M.824 gives the technical characteristics of a general-purpose maritime radar beacon;

RECOGNIZING that many Member States and other appropriate competent authorities have installed maritime radar beacons as general-purpose Marine Aids to Navigation;

HAVING CONSIDERED the proposals made by the IALA ENG Committee;

RECOMMENDS that radar beacons (Racons) provided by Member States and other competent authorities should conform to the technical parameters set out in Annex A to this Recommendation.

ANNEX A TECHNICAL PARAMETERS FOR A GENERAL-PURPOSE MARITIME RADAR BEACON (RACON) (ADAPTED FROM ITU-R M.824-4 ANNEX 1)

Item		Specifications
1 Antenna	Polarization	In the 9 GHz band, suitable for responding to radars using horizontal polarization. In the 3 GHz band, suitable for responding to radars using horizontal polarization and to radars using vertical polarization (see Note 2).
2 Receiver	1 Frequency band	9 300 - 9 500 MHz and/ or 2 900 - 3 100 MHz (see Note 1).
	2 Recovery period	≤ 100 µs after end of response. This is the maximum amount of time a racon can use for 'housekeeping' before being ready to receive the next radar interrogation.
	3 Radar pulse length	≥ 0.05 µs (see Note 1).
3 Transmitter	Frequency	Transmission should occur either: • on the frequency of the interrogating signal with a frequency tolerance of ± 3.5 MHz for interrogating pulses with a duration of less than 0.2 µs, or, with a frequency tolerance of ± 1.5 MHz for pulses with a duration equal to or more than 0.2 µs, or • by a series of sweeps covering the entire frequency band of the receiver in which the signal was received. Where the transmission consists of a series of sweeps, the form of the sweep shall be sawtooth and should have a slew rate of between 60 s and 120 s per 200 MHz (see Note 3).
4 Response	1 Delay after receipt of interrogation	Normally not more than 0.7 µs.
	2 Form of identification	Identification coding should normally be in the form of a Morse letter. The identification coding used should be as described in the appropriate navigational publications. The identification coding should comprise the full length of the radar beacon response and, where a Morse letter is used, the response should be divided with a ratio of one dash equal to three dots and one dot equal to one space. The coding should normally commence with a dash.
	3 Duration	The duration of the response should be approximately 20% of the maximum range requirement of the particular radar beacon, or should not exceed five miles, whichever is the lower value. In certain cases, the duration of the response may be adjusted to suit the operational requirements for the particular radar beacon (see Note 2).
	4 Compatibility	Should be compatible with all types of magnetron and solid-state radars (see Notes 1 and 2.

NOTES

Note 1: Differences between these parameters and ITU-R M.824-4 are:

- For historical and compatibility reasons, the IALA frequency range for 9 GHz band is 9 300 – 9 500 MHz while ITU is 9 200 – 9 500 MHz.
- Radar pulse length upper limit omitted to allow support for solid state radars.
- Response Compatibility has been added.

Note 2: Characteristics for antenna aperture, gain and polarization, receiver sensitivity, transmitter power, racon response duration, racon ON period/ OFF period, side-lobe suppression and solid-state radar compatibility should be determined by Authorities.

Note 3: Swept frequency racons are obsolescent and are not recommended for new installations.