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| IALA Recommendation |

R0101

Marine Radar Beacons (Racons)

Edition 3.0

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

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| Date | Details | Approvals |
| January 1995 | 1st issue |  |
| December 2000 | Edition 1.1 |  |
| September 2004 | Edition 2  General Revision including updating information and clarification of terms.  Discussions underway at IMO and ITU on S band radars; concern over future of Racons. |  |
| September 2020 | Edition 2.1 Editorial corrections. |  |
| October 2025 | Edition 3.0  Updated to new format. Moved guideline text to new Guideline 11xx. Updated and clarified the Technical Parameters Table. |  |
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THE COUNCIL

**RECALLING** the function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment

**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 Aids to Navigation Authorities have installed maritime radar beacons as general-purpose aids to navigation;

**HAVING CONSIDERED** the proposals made by the IALA ENG Committee;

**RECOMMENDS**:

* That radar beacons (racons) provided by Aids to Navigation Authorities should conform to the technical parameters set out in this recommendation.

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

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| 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 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 on the previous table

**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.

# RELATED DOCUMENTATION

IALA Standard 1030 – Radionavigation Services

IALA Recommendation R0130 Categorisation and Availability Objectives for Short Range Aids to Navigation

IALA Recommendation R0146 Strategy for Maintaining Racon Service Capability

IALA NAVGUIDE

IMO Resolution MSC.192(79) – Radar Performance Standards

IMO Resolution A.615(15) – Radar Beacons and Radar Transponders