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Technical Domain / Task Number 2 WG1

Author(s) / Submitter(s) Pärtel Keskküla

Definition of Nominal Range

# Summary

Based on reading the document *ARM14-7.3.12 WP Task 1.5.3 - New Definitions for IALA Dictionary* the following observations and proposals are made.

While specific thresholds of illuminance are an essential part of the concept of the nominal range (R0202(E200‐2)), its values are not present neither in the present nor proposed IALA definition of the nominal range. To obtain a single and sufficient definition, therefore it is proposed **to amend the definition of nominal range by including the values of the threshold of illuminance on the eye of the observer in the definition**.

The present IALA guidance on calculation of luminous range of lights (R0202(E200‐2)) uses meteorological visibility, not atmospheric transmissivity, in calculations luminous range. Therefore, it is proposed to **use meteorological visibility instead of atmospheric transmissivity in the definition of the luminous range**.

This observation is not based on the ARM14-713.12. Despite “nautical mile” being used as the dominant unit of distance in the work of IALA and in navigation general there are some definitions in the IALA Dictionary where “sea mile” is (still) used. As work seems to be in progress on some terms in the IALA dictionary it is proposed to **replace “sea mile” with “nautical mile” in the relevant definitions in the Dictionary**.

# Discussion

## Inclusion of E in the definition of Nominal Range

In R0202(E200‐2) Marine Signal Lights ‐ Calculation, Definition and Notation of Luminous Range the IALA council recommends

* that all luminous range calculations are based on Allard’s law:

Where:

I is the luminous intensity of the light [cd]

*E* is the illuminance at the eye of the observer [lx]

*D* is the luminous range in metres [m]

*V* is the meteorological visibility in metres [m]

* that the Nominal Range of a maritime signal light is calculated for a meteorological visibility of 10 nautical miles (18,520 m) and an illumination at the eye of the observer:

of 2 × 10‐7 lx for night time range

of 1 × 10‐3 lx for day time range

In IALA Dictionary the nominal range of a light is and in *ARM14-7.3.12 WP Task 1.5.3 - New Definitions for IALA Dictionary* it is proposed to be defined by the term “luminous range” and the meteorological visibility of 10 NM. Luminous range, in turn, is defined (among the other things) by “the threshold of illuminance on the eye of the observer” whose value is not specified (see Table 1).

1. Excerpt from ARM14-7.3.12 WP Task 1.5.3 - New Definitions for IALA Dictionary

|  |  |
| --- | --- |
| **Old Definition** | **Proposed Definition** |
| [Luminous Range](https://www.iala-aism.org/wiki/dictionary/index.php/Luminous_Range)  **Luminous** **Range** (of a light) The maximum distance at which a light can be seen, as determined by the **luminous** intensity of the light, the atmospheric transmission factor and the thresho…. | **Luminous range (of a light)**  The maximum distance at which a light can be seen, as determined by the luminous intensity of the light, the atmospheric transmission factor and the threshold of illuminance on the eye of the observer |
| **Nominal** **Range** (of a light) ...nominal **range** of a light used as an aid to marine navigation is its luminous **range** in a homogeneous atmosphere in which the meteorological visibility … | **Nominal range**  The nominal range of a light used as a marine aid to navigation is its luminous range in a homogeneous atmosphere in which the meteorological visibility is 10 NM |

So, while specific thresholds of illuminance are an essential part of the definition of the nominal range, as defined in the R0202, its values can’t be found neither directly nor referenced in the definitions.

While such definition referring to the definition may follow the bulleted structure in R0202 it is not very good in practical use where it would be convenient to have all the essential parameters of this quite often used term in one single ready-to-use definition.

As nominal range is defined separately for night time and for day time it may not be practical to put both of them in one sentence in the definition, and alternative wordings can be considered. One way would be to create a new term “nominal conditions” that is defined in separately in the frames of the definition of the nominal range. Below are proposed some alternative wordings for consideration and possible amending. Another question could be if the word *nominal* should also be added to the “day time range” and “night time range”, as shown in the examples below.

1. “The nominal range of a light used as a marine aid to navigation is the maximum distance at which a light can be seen, as determined by the nominal conditions / in the nominal conditions. The nominal conditions are meteorological visibility 10 NM and the threshold of illuminance on the eye of the observer 2 × 10‐7 lx (0.2 microlux?) for night time *nominal* range and 1 × 10‐3 lx for day time *nominal* range.”

2. “The nominal range of a light used as a marine aid to navigation is the maximum distance at which a light can be seen, as determined by the luminous intensity of the light, the meteorological visibility in homogeneous atmosphere being 10 NM and the threshold of illuminance on the eye of the observer being 2 × 10‐7 lx (0.2 microlux?) for night time *nominal* range and 1 × 10‐3 lx (1.0 millilux?) for day time *nominal* range.”

3. “The nominal range of a light used as a marine aid to navigation is the maximum distance at which a light can be seen, as determined by

* the luminous intensity of the light,
* the meteorological visibility in homogeneous atmosphere being 10 NM and
* the threshold of illuminance on the eye of the observer being
  + 2 × 10‐7 lx (0.2 microlux?) for night time *nominal* range and
  + 1 × 10‐3 lx (1.0 microlux?) for day time *nominal* range.”

## Using V instead of T in the definition of Luminous Range

IALA Guidance on calculation of luminous range of lights (R0202, G1148, guidance on leading lines) uses meteorological visibility instead of atmospheric transmissivity in calculations of both luminous range in general and nominal range. At the same time transmissivity is used in the definition of luminous range. As it would presumably be desirable to be concise in all IALA documents it would make sense to use meteorological visibility instead of atmospheric transmissivity in the definition of luminous range, too.

## Replacing “sea mile” with “nautical mile”

Despite “nautical mile” being used as the dominant unit of distance in the work of IALA and in navigation general there are some definitions in the IALA Dictionary where “sea mile” is (still) used. As work seems to be in progress on some terms in the IALA dictionary it is proposed to replace “sea mile” with “nautical mile” in the relevant definitions in the Dictionary.

## Liaison with CIE

The CIE dictionary has the definition of nominal range (<https://cie.co.at/eilvterm/17-31-027>) that seems to be a copy of the IALA version. Therefore it is suggested that a liaison note is sent to CIE asking them to update their definition to reflect whatever IALA agrees.

# Action requested of the Committee

Consider the proposal and, if found relevant, make a proposal (liaison note) to ARM to amend the definitions.

Send a liaison note to CIE on updating the definition in CIE dictionary when agreement on the definition is reached in IALA.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)