**Purpose**

The purpose of this paper is to summarise the work previously undertaken by WG1 on the review of the Leading Lights Recommendation *R0112 Leading Lights* [1]and Guideline *G1023 the Design of Leading Lines* [2]and its accompanying Excel workbook [3]. This is the work described in the relevant ENG17 task register [4] The scope of this work includes tasks to:

* Establish the work carried out to date.
* Highlight considerations for the current WG1.
* Suggest a way forward to progress the task.

Note the difference in terminology between the Recommendation and the Guideline – Leading Lights vs Leading Lines. The Recommendation is concerned with the luminance values, separation of lights and sensitivity of leading line lights, and the Guideline provides this information in the context of the design of the supporting infrastructure, e.g., placement of towers, channel proportions, dayboards etc., as well as the luminous intensity of the lights.

**Background**

At ENG 14 (Autumn 2021) Frank Herman (German Federal Waterway and Shipping Administration) and Partel Keskkula, (Estonian Transport Administration) presented a review of the relevant IALA publications relating to leading lines in input paper under ENG13 Agenda Action Item 29 [5].

This reviewed the three existing documents:

* Recommendation R0112 (E-112) Leading Lights
* Guideline G1023 The Design of Leading Lines
* Leading Line Design Programme (MS Excel workbook)

The input paper states that the review was carried out for the following reasons, in summary:

* There are examples of inconsistent definitions and dimensions used between the Recommendation, Guideline and Excel workbook.
* The Guideline does not reflect the requirements of the Recommendation completely.
* The explanatory text designed to assist with the workbook is in some cases limited and unhelpful.
* For ranges above 5 nautical miles the resulting values for luminous intensity and daymark size become too large for practical application.
* The calculations include specific daymark dimensions based on the regulations of the U.S. Coast Guard, rather than the IALA Guideline G1094[6] .
* There are errors in all the three documents.

**Main findings of the work carried out to date**

The input paper suggests a revision of the IALA publications such that the Recommendation is withdrawn, and that the existing Recommendation information is distributed between two documents, a Guideline and a tutorial. This is shown in the diagram extracted from the input paper in Figure 1:

A diagram of a new tutorial

Description automatically generated

Figure 1 Suggested arrangement of documents taken from reference [5]

Partel and Frank revised the documents in accordance with Figure 1 and the relevant output from ENG 14 was a series of documents as follows:

* ENG14-3.1.1.2 Revised G1023 on Design of Leading Lines [7] – A revised Guideline that contains material from the Recommendation R0112 and the existing G1023 Guideline.
* ENG14-3.1.1.4 Spreadsheet Tutorial [8] – An explanatory document to assist users of the Excel workbook.
* ENG14-3.1.1.3 Revised Leading Line Design Programme E-112-2 [9] – A revised Excel workbook with modified parameters. Note that there are two versions of the spreadsheet in the Leading Lines folder in the output from ENG14. It is not immediately clear which one should be used.

It is suggested by Partel and Frank that the Recommendation is withdrawn completely.

**Initial Comments**

1. If the Recommendation *R0112* is removed, what essential information will be missed? Is it covered elsewhere? Where will the Guideline sit? The argument for its complete removal is not clear, although understandable why the detailed information should sit within the Guideline.

***Proposed action – discussion within WG1/ENG on validity of Recommendation***

*Update – group agreed to retain Recommendation in principle; Leading Lines and Lights is a specific situation that requires a recommendation on the separation and sensitivity parameters. Sarah to highlighlight where Frank and Partel had pointed out inconsistencies between the Recommendation and the Guideline a part of item 2 action*

1. The proposed Guideline *G1023* is now a long explanatory document that contains tracked changes with comments from Partel, commenting on Frank’s initial rewrite text. This requires detailed review, perhaps in comparison with the *Cerema* document [10] presented at ENG17. The Cerema document has a similar intention to the proposed revised *G1023* to take the reader through the process, referring where appropriate to the supporting theory. *G1023* requires various reviews – technical detail, logical progression, and grammar.

***Proposed action – Sarah to review document from non-expert view and identify technical comments raised previously by Partel, and grammatical revisions. Technical expert TBC in parallel, to review technical content and then compare versions with Sarah.***

*Update – agreed Sarah to review as non-expert, Marina to review as expert and Lingyan will contact Partel to see if he can be encouraged to continue this work for continuity and to avoid repetition or duplication of effort.*

1. The proposed tutorial document requires similar review to the Guideline. Perhaps this could be called a Manual in alignment with other documents and maintained by WWA but this requires formal agreement with the WWA.

***Proposed action – when proposed G1023 has been reviewed technical expert and Sarah to review effectiveness of tutorial document in conveying the suggested leading line and light design process. Check place the tutorial document/manual should exist.***

1. The proposed new version of the Excel Workbook requires a “sensitivity” test, comparing results to the existing workbook and referring to the descriptions of changes in the input paper [5]. It is important to establish the difference, if any, between the two versions of the workbooks as mentioned above.

***Proposed action – technical expert to review the workbook following review of proposed G1023 to establish differences to existing version.***

**References**

*All of the reference documents listed below (plus this document )are in a folder in the ENG 18 fileshare*[**https://nextcloud.iala-aism.org/index.php/s/8BYwHZ2gyrHktDe**](https://nextcloud.iala-aism.org/index.php/s/8BYwHZ2gyrHktDe)

1. IALA. (2005) Recommendation R0112 Leading Lights
2. IALA. (2005) Guideline G1023 The Design of Leading Lines
3. IALA. (2001) Design of Leading Lines Program (Excel Workbook)
4. IALA. Task 2.1.4 Develop e-112 leading lights and G1023 leading lines into a guideline October 2023
5. IALA. Report ENG 13, Action item 29 Input paper: IALA Documents on Leading Lines April 2020 (ENG 14)
6. IALA. (2016) Daymarks for Aids to Navigation
7. IALA. (2020) ENG14-3.1.1.2 Revised G1023 on Design of Leading Lines
8. IALA. (2020) ENG14-3.1.1.4 Spreadsheet Tutorial
9. IALA. (2020) ENG14-3.1.1.3 Revised Leading Line Design Programme E-112-2
10. Cerema. (2021) Guide sur la conception d’alignements utilisables à l’usage de signalisation maritime et fluviale (English PDF Google translated also available)