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| From: EEP Committee | ANM17/9/9  Formerly EEP16/output/7 |
| To: ANM Committee | 1 April 2011 |

Liaison Note

Simulation in the Design of AtoN

# Introduction

A liaison note from ANM (EEP16/8/12) advised that ANM is devising a supplementary guideline to Guideline 1058, which aims to provide *technical* detail for simulator providers and procurers of simulators to ensure appropriate components and quality for AtoN features. This is being developed to satisfy the expression by AtoN designers, developers and researchers, that they wish to go deeper into how simulation can be more specifically used for:

* Comparison of individual light sources
* Research & Development work related to the development, validation and testing of lights and marks to be used during day and night

ANM requested that EEP should:

* Review the list (outlined in Annex A of the liaison note) of features relevant to be addressed in a supplementary technical guideline on simulation.
* Provide feedback and comments on the relevance of the listed features and whether additional features, relevant to simulation, should be considered in the guideline.

# Discussion

EEP16 reviewed the list at annex A of the ANM liaison note and provides a revised list at Annex A to this liaison note. The authors revised the list by amalgamating some subjects under common headings and by providing additional detail they considered should be used when providing technical detail to simulator manufacturers and providers.

## Past experience of Simulators

German Waterways has previously conducted trials in 2009, where it used test equipment normally used for measuring AtoN in the ‘real’ world, to measure screens and projection equipment of a bridge simulator.

After this trial, it considered that the projectors and screens were not of sufficient ‘quality’ for conducting viewing trials as “real-world” scenarios and did not simulate the natural world; however, they were very good for simulation of navigation practices.

For instance:

* The resolution of the screens was insufficient to simulate the resolution of the human eye
* The maximum illuminence of the projectors was about 100-300 Candelas per metre; real-world Illuminence is around 10,000 candelas per metre
* Contrast is not comparable either; contrast of computers, projectors and screens is around 1:1x104, actual real-world contrasts are around 1:1x107.

Although simulation is excellent for modelling general navigation techniques, EEP recommends that at this time, IALA members should be cautious in utilising simulators for viewing trials and comparisons of light sources and daymarks for R&D purposes.

# Action requested

Due to the highly technical subject matter, EEP considers that it is best placed to provide technical details to simulator providers. Therefore, after the user analysis has taken place, EEP requests that it should be provided with the detailed requirements in order that these should be considered for the provision of technical details to manufacturers and providers of simulation equipment where required.

1. Preliminary list of features relevant to be addressed in a supplementary technical guideline on simulation (amended at EEP16)
2. Colours of lights and daymarks
3. Size of daymarks
4. Background light intensity:
   1. Sky glow covering both ambient light
   2. Glare above cities
   3. Influence of moving objects onshore like e.g. cars, port operations, aircraft ground movements
   4. Reflection of light from structures
   5. Cultural lights dispersal in the atmosphere
5. The influence of on-shore background lights (rival lights)
6. Use of fluorescent paint on daymarks
7. Flickering lights
8. Contrast (colour and luminance)
9. Day/Night/Dusk/Dawn light conditions (linked to contrast and visibility)
10. Flashing light caused by rotating wind turbine blades
11. The nature of light distribution by atmospheric conditions. For example:
    1. Visibility
    2. Humidity
    3. Air temperature
    4. Pollution
12. Light affected by angle of sun
13. Effect of AtoN failures
14. Synchronised and sequential lights
15. Tide and sea-state conditions