

## VOCABULARY: OSCILLATING AtoN CONCEPTS

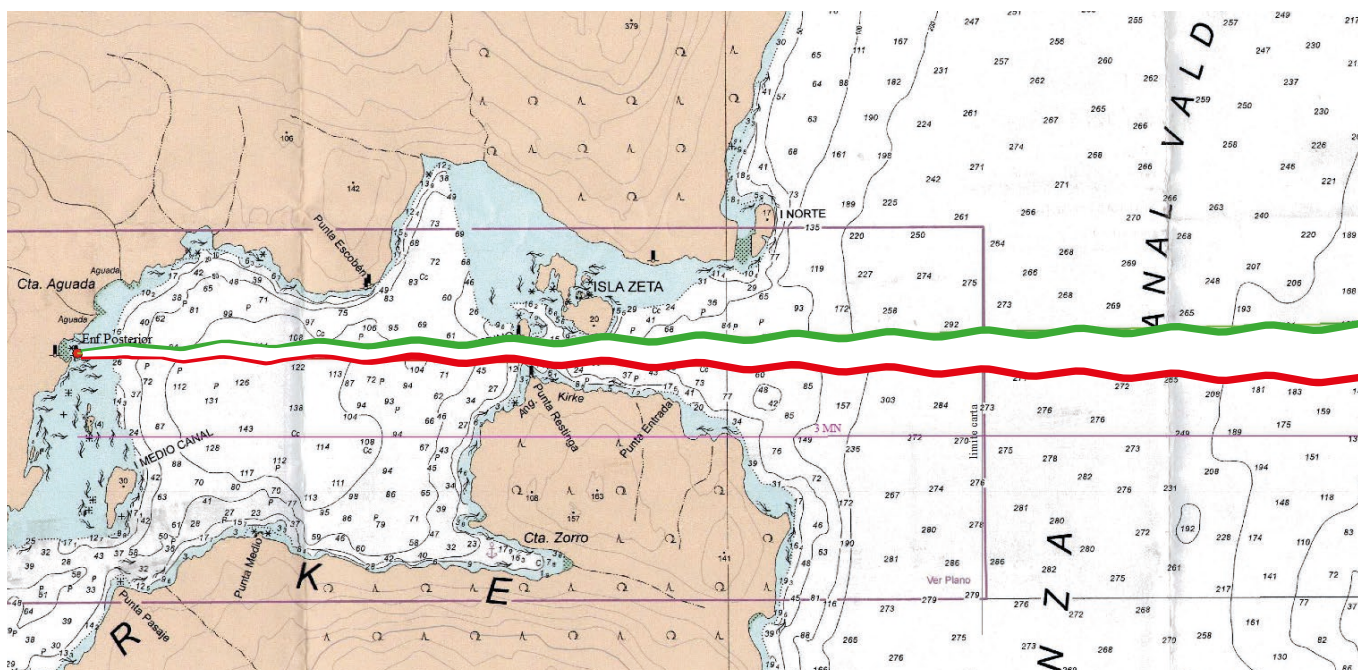
Based on IALA International Dictionary of Marine Aids to Navigation

The last article from **MSM Academy** covered the operation of oscillating sector lights, which are a special solution used in leading lines. In this new issue we will continue analysing these AtoN solutions, focusing on some specific **concepts about oscillating boundaries** to reinforce and clarify some notions on this subject.



### Oscillating Boundary

An **Oscillating Boundary** in a **sector light** is a **method of giving more information of position near the sector boundary to the mariner** by creating a light character with alternately flashing colours.



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### Oscillating Boundary

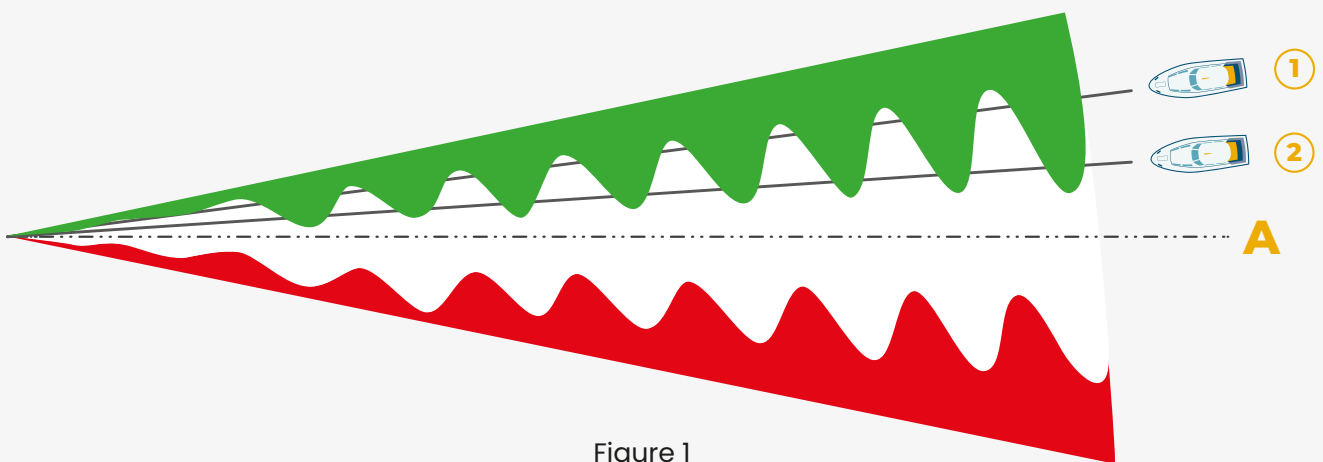


Figure 1

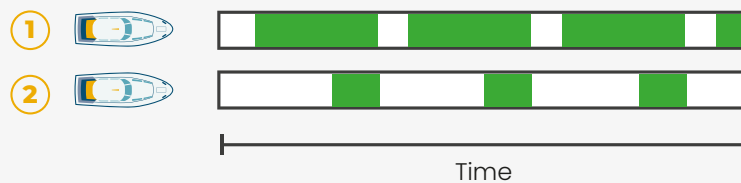


Figure 2

In the **first position** (line 1, figure 1) **the vessel is far outside of the safe channel** and the mariner sees **alternating flashes with a long green duration and a short white**. Approaching the axis, the flash duration of the green flashes will decrease whereas the white flashes increase, so the flash duration of the white flashes becomes longer than the green ones (line 2, figure 1). Finally, **when the safe sector, line A, is reached, only a fixed white light is seen**.

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### **A** Angle of Uncertainty

The **angle of uncertainty** is the **region where the colour and/or the flash rhythm changes**. The mariner typically sees a **mixture of the two sector characters**, and this causes an uncertainty where **the mariner is unable to distinguish between the two sectors**. The understanding of this aspect is very important for the design of a sector light.

In most cases **the angle of uncertainty should be as small as possible** or defined by the navigational requirement.

The basic mechanism that determines the achievable minimum angle of uncertainty differ between types of Sector Lights.

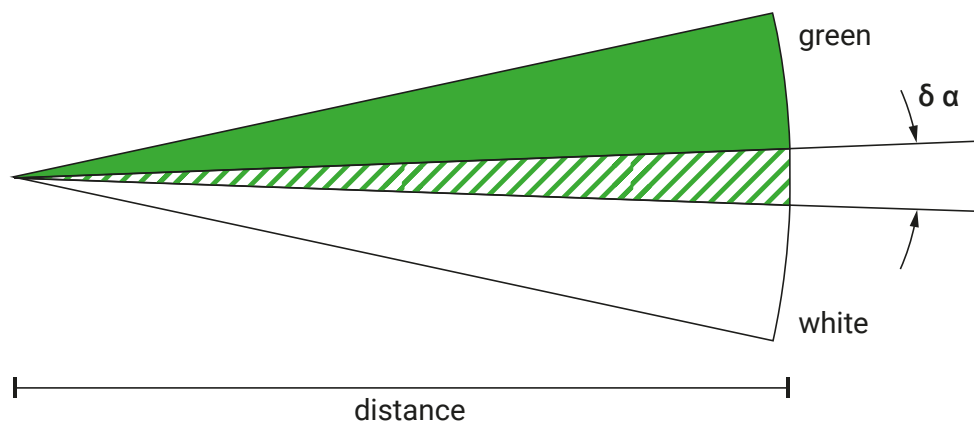


Figure 3. Angle of uncertainty

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### P Position Precision

The **degree of accuracy of a position regarding random errors**.

When using sector lights, this relates to the quality/quantity of the information received by the AtoN signal in each of the sectors.

“the degree of accuracy  
of a position regarding  
random errors”

### F Oscillation Factors

The **factors that define oscillation** are:

**Oscillation period:** This is **the time it takes for the oscillation system to complete a full cycle**. The set time must be long enough to allow identification of the times by the navigator and short enough to allow a quick response time. Typical values are close to one (1) second.

**Oscillation amplitude:** The oscillation amplitude is **the maximum displacement angle of the oscillation system in a half cycle** (the complete cycle is two sweeps of this angle, back and forth). **The oscillation amplitude defines the width of the oscillating sectors**. This value depends on the design of the leading light, but, in any case, the fixed white sector and the oscillating sectors, in the far zone, must fall within the channel.