IALA GUIDELINE G1078

The choice and distribution of Aids to Navigation must be adhered to the guidelines established on the IALA MBS, however, for internal channels and inland waterways national regulations may be applicable. The manager of navigation aids is responsible for ensuring that these are indicated on the nautical charts.

AToN MARKING THE FAIRWAY BOUNDARIES

As a rule, the following principles must be applied:

1. A fairway shall be marked, in principle, by lateral marks.
2. 0There shall be Aids to Navigation in bends and junctions of the fairways.
3. Lit AtoN should be used at least in:
4. The beginning and the end of each fairway.
5. Changes of direction in the fairways.
6. Aids to Navigation should be spaced evenly along the fairway, when possible.
7. The useful range of buoys both day and night should be greater than the distance between them, also, RADAR appearance should be considered.
8. The distance between daymarks is based on their size and daytime visibility range.
9. When Ais to Navigation are installed in pairs, on both sides of the channel, thay should be spaced and equal distance from the central axis of the fairway.
10. If high navigational accuracy is needed, AtoN should be placed in pairs (“gates”), in any other case a staggered arrangement could be considered. In some cases, even positioning AtoN only on one side of the fairway could be an option.
11. As separation between Aton “gates” should be smaller than the AtoN range, separation and mark size are closely related. If a mark size is established, separation should be calculated. If a determined separation is preferred, AtoN should be sized in accordance. This is usually an iterative process, and economical, operative, navigational, and level of risk perspectives should be examined.
12. As a rule, a high density of Aids to Navigation ensures a easy and safe level of navigation. However, there is a saturation point where adding aids does not improve the fairway marking. To find the ideal AtoN distribution, simulations and risk assessment are a very useful and recommended tool.
13. Establishing a set of pre-designed AtoN, adhered to the most common/useful ranges is recommended. This way, the most suitable AtoN can be chosen from this “toolbox” in each case, improving uniformity and reducing economical costs.

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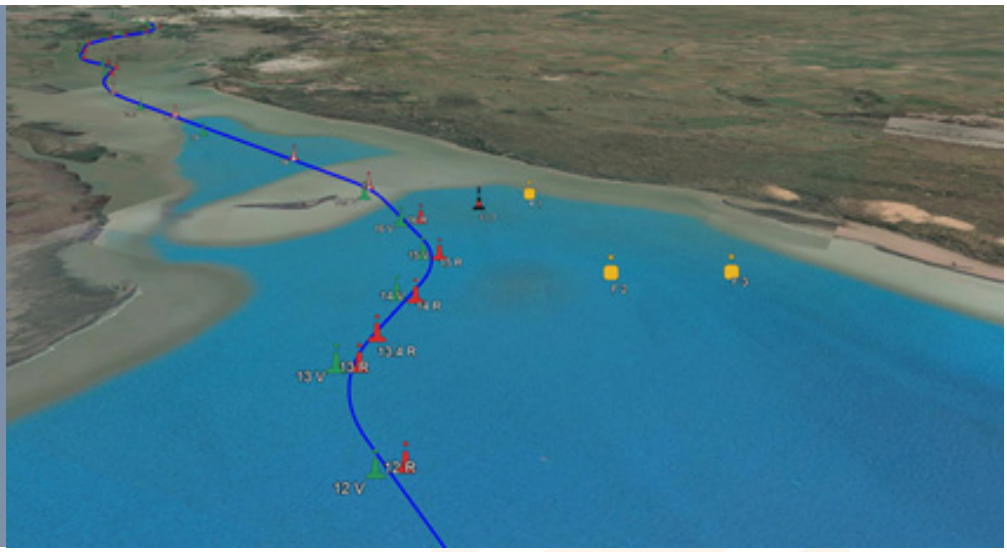

In addition to boundary marking, other AtoN should be used in the right mix to mark:

- *Critical points.*
- *The center of the fairway.*
- *Change of direction.*
- *Isolated dangers.*
- *Other areas (mooring zones, restricted navigation areas…)*

FIXED VISUAL AtoN OUTSIDE THE FAIRWAY

LEADING LINES

They can be used where there are straight stretches in the fairway, principally in the following cases:

- *If the middle of the fairway needs to be marked.*
- *When other AtoNs could be affected by ice, severe weather or tides.*
- *There is a deeper channel for deep draft vessels inside the fairway.*
- *Strong lateral currents are usual.*
- *Also can be used to mark fairway boundaries, if this function is clearly shown on the relevant charts.*

More details for the design of leading lines can be found in IALA Guideline No. 1023 and in the IALA NAVGUIDE.

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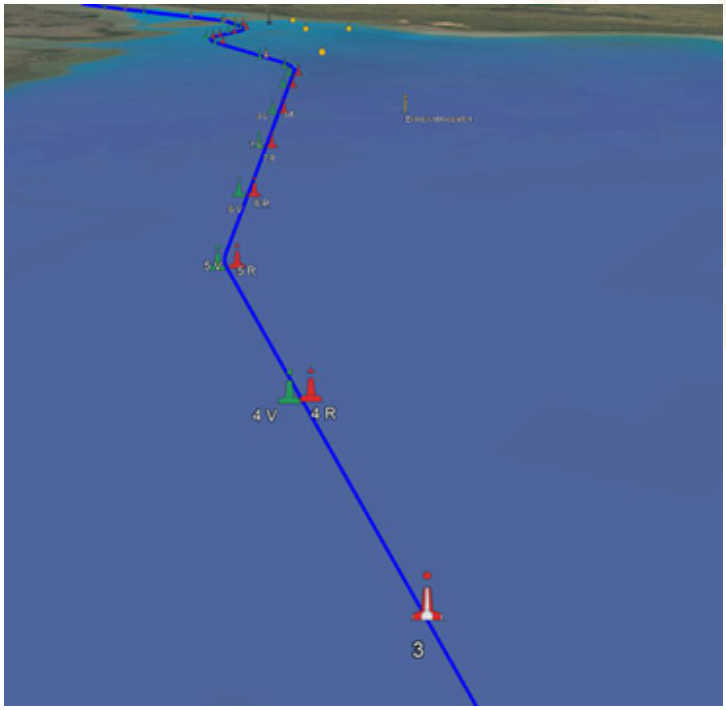
SECTOR LIGHTS

A sector light displays different colors / rhythms at different angles, providing positional / directional information to the mariner.

A sector, or the boundary between two sectors, can indicate a channel, a turning point, a junction, a danger or other points of importance to the navigator.

For the design of sector lights, the process established in IALA Guideline G01041 “Sector lights” must be followed.



DESIGN METHODOLOGY/PROCEDURE:

· Establish a conspicuous AtoN (high visibility), at the beginning of the fairway.

· Place AtoN at points where:

- Vessels have to alter their course.

- The fairway boundary line or the middle line has a bend or curve.

- Critical shallows and rocks, or other hazards, form the boundary of the fairway.

- Fairways intersect.

· Distribute buoys between these points with regard to their useful range.

NOTE:

In any case, when the nearest buoy is being approached, the mariner should be able to see at least the next buoy along the fairway. Therefore, AtoN useful range must be always higher than AtoN separation.