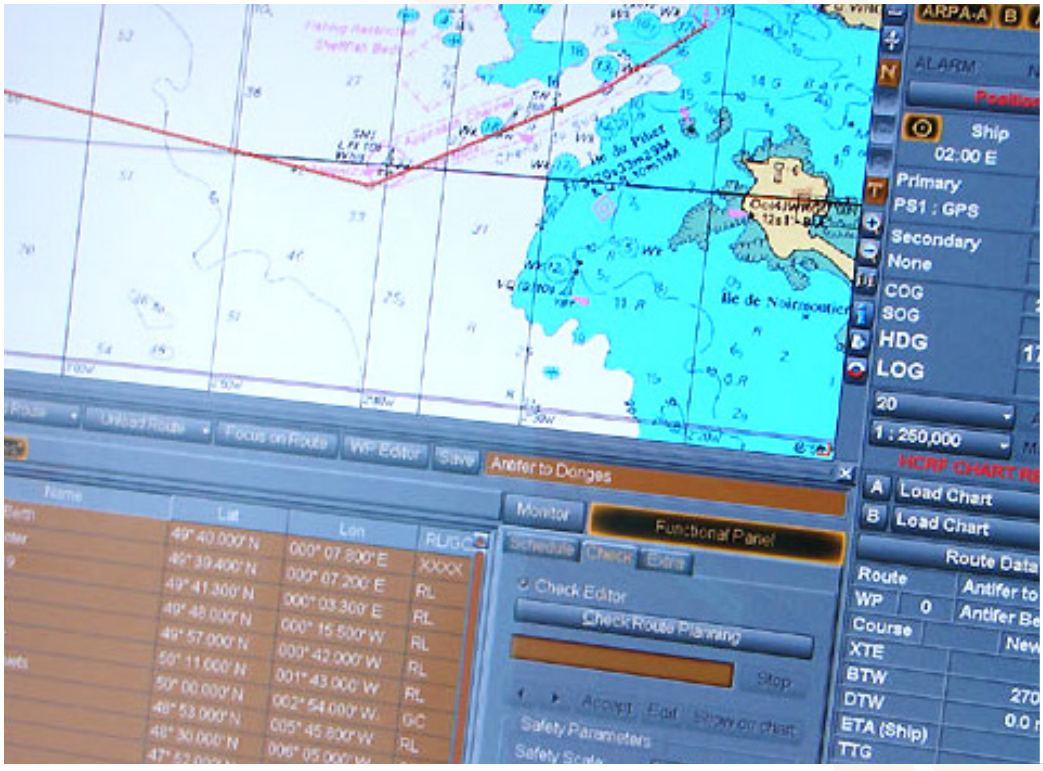
IALA GUIDELINE G1078

The performance of an **Aids to Navigation** system directly depends on the design characteristics established in the design phase. In this article are exposed the most relevant characteristics for the evaluation of the performance of navigation aids.

POSITION ACCURACY

Position accuracy for **GPS and radionavigation systems,** even improved with differential systems, can be assumed to be 10 meters. These systems provide absolute position information (not relative to other positions) and must be used in conjunction with nautical charts.



Usually, **visual aids** do not provide accuracies better than 10 meters, however, their relative accuracy is good (in relation to obstacles, channel limits ... etc).

In the case of **floating aids to navigation,** precision is even lower and difficult to define, as it is largely affected by:

- Draft variations.
- Different mooring set designs and typologies.
- Tides.
- Currents.
- Wind.
- Imprecisions on the sinker positioning.

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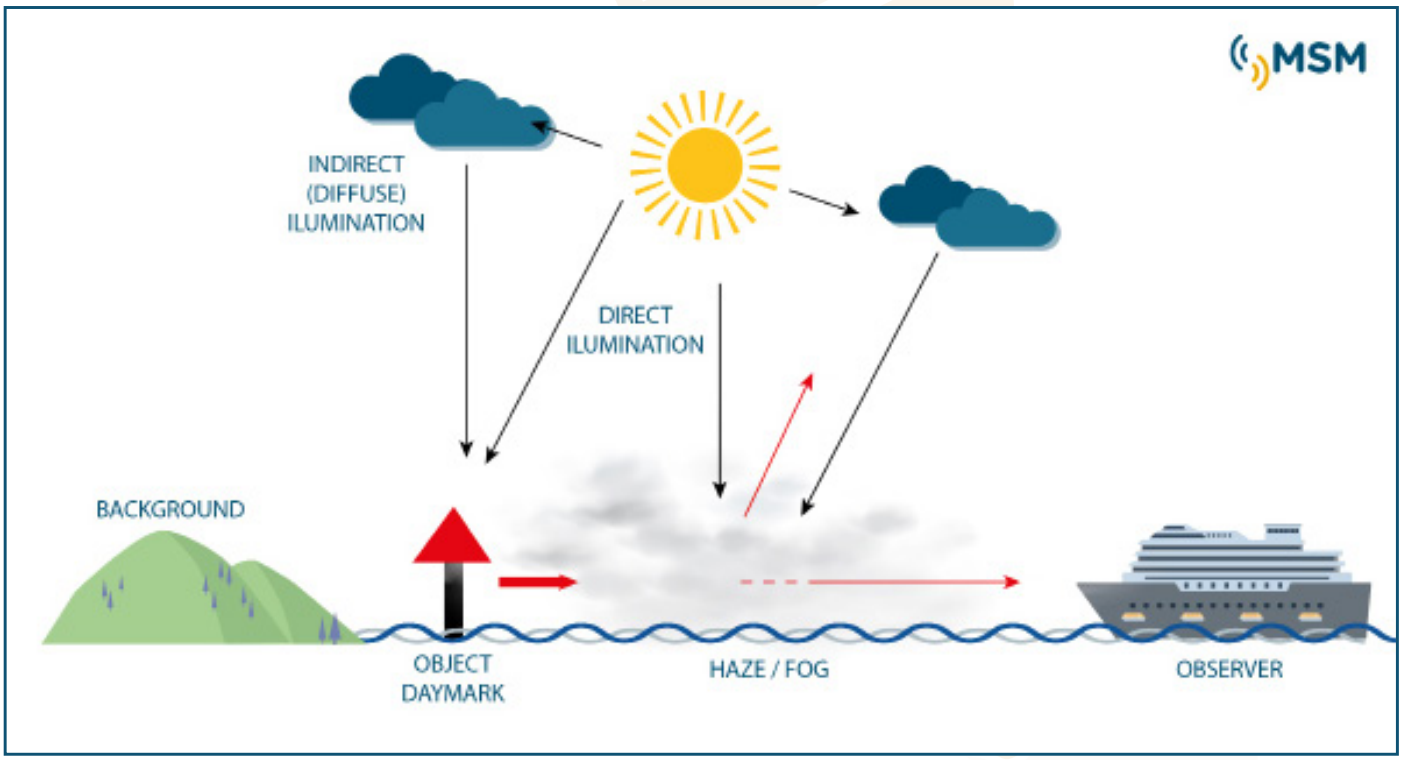
REDUNDANCY

Relying on a single aid to navigation can result in overly high and unattainable reliability requirements. Therefore, deployment of multiple aids should be considered, providing redundance and solving this problem.

The duplication of navigational functions with multiple navigation aids systems reduces maintenance costs associated with emergency reparations and can provide an easier and safer transition period for navigators when the established AtoN layout is modified.

PERCEPTION

When designing a fairway, the distance from which the AtoN can be **detected, recognized and identified** by the mariner, is a critical factor. For visual perception, this concept is also called the useful range.



The useful range depends on many factors, mainly:

- The characteristics of the navigation aid (height, visual surface, color, shape ...).
- The human eye.
- The atmosphere transmissivity conditions.
- Conspicuity (ability to stand out in a complex visual scene).

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To identify an aid to navigation, the navigator must verify the information provided by it (color, shape, rhythm, identifications ...).

The characteristics that facilitate the identification and allow the perception of an Aid to Navigation are:

- In lighted beacons: light intensity, color, divergence, rhythm ...
- In daymarks: Color, shape, size, contrast with the background ...
- In a RADAR AtoN: Height, radar cross section (RCS), active radar emitters.

AIS aids to navigation are a unique case since the unmistakable identification of the AtoN is carried out through the system itself. It also provides:

- Day / night operation in any meteorological condition.
- Long-range.
- Improved perception, showing the position of the aid on the electronic nautical chart.
- Confirmation of the integrity of the aid, including status of the beacon and incorrect position alarms.