

# Beacons and Buoys, Aids to Navigation

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Lighthouses

On land, people get from place to place by using maps and by paying attention to street signs, stop signs, detours, and traffic lights. On the water, mariners navigate by using nautical charts and by paying attention to Aids to Navigation (ATON)-lights, buoys, daymarks, and fog signals. A nautical chart is a special map that shows what is under, in, on, and around water.

Buoys are floating aids that are anchored to the seabed. Boaters interpret what they mean by their shape, color, and the characteristics of lights and sound signals. Beacons are fixed to the earth's surface (not floating) and can be anything from big lighthouses to a sign nailed to some pilings. Lighted beacons are simply called lights; unlighted beacons are called daybeacons and have shapes or colored signs to distinguish them from other beacons.

Mariners can determine which beacon or buoy they are looking at by how they are marked and then comparing them to the chart. Buoys come in different shapes and colors and many are marked with numbers. Lighthouses are painted in different patterns and colors so they can be distinguished from one another. The characteristics for all ATON maintained by the Coast Guard are noted on charts and published in the USCG Light List. It is important that mariners don't confuse one navigational aid with another one.



Buoys

The way the light is produced in lighthouses and lightships changed over time with the development of new technologies. The first lighthouse ever built, the

Pharos lighthouse in Egypt, built in the 3rd century BC, was lit with fire and was reflected out to sea with mirrors. Some of the earliest lights were made with multiple-wicked oil lamps with reflectors to concentrate it into a beam of light. In the 1820s, a French physicist, Augustin Fresnel, invented a special glass lens with rings, reflectors, and prisms that surrounded a single lamp. These lenses proved to be so effective that many are still used today.



Lens

Fresnel

Sound signals are also used to guide boats and ships in reduced visibility, such as fog. In colonial times, people fired cannons from shore to warn ships that they were getting close to land. Today, many buoys and beacons are equipped with bells, whistles, gongs, horns, and air sirens.

Lightships were floating aids to navigation that were stationed in places where it was either too deep, too far from shore, or too dangerous to build a lighthouse. These vessels carried the same aids to navigation as lighthouses. The Coast Guard doesn't use lightships anymore. In 1983, the Nantucket Light ship, the last lightship in service as an ATON, was replaced with a Large Navigational Buoy (LNB). These “monster buoys” are up to 40 feet in diameter. Different types of towers are now built in some of the stations that used to be marked by lightships.

