

What Is A Lighthouse? A Modern Definition

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Introduction

Many of the published definitions for the term 'lighthouse' are inadequate in today's English language cultures. A proposed new definition of a lighthouse is:

A fully or partially enclosed built structure bearing a light that is used as a navigational aid, and that is capable of admitting at least one person to operate or maintain the light entirely from within.

Structures that were once lighthouses, but are no longer lit are known as historic lighthouses.

In this paper the author describes a set of definitions suitable for use in pharology, and especially in applications involving databases. The differences between various kinds of navigational aids are explained.

The Terminology of Navigational Aids

The origin of lightstructures for assistance with marine navigation at night is lost in the unwritten pages of history, for we are fairly sure that the first lighthouses were built before humans committed their thoughts to paper (or the equivalent medium of the time).¹ In the English language this lighthouse legacy, spanning about three millennia, inevitably leads to imprecise use of terms associated with lighthouses and navigation, a matter that can be of importance in different situations. Humans grow up learning how to interpret the ambiguities that commonly arise in daily life. For example, people easily distinguish words that sound identical but which have different meanings: bow and bough is a typical example. Sometimes two people use the same word to mean different things. This is not easy to deal with and, if a question is not asked to resolve the uncertainty, a mistake may be made. Many human errors arise because of ambiguities based in both language and actions. There are many times every day when we deal with imprecise information. The binary digital world has many advantages, but analogue functions are commonplace in human life. In mathematics, the term 'fuzzy' is used to describe things that cannot be described merely as true or untrue and we can think of language as especially 'fuzzy' in nature.

Computers are far less forgiving than humans. Based totally on the digital language of ones and zeros, they are generally incapable of dealing with fuzzy parameters, unless specifically programmed to do so. Though this may change in the future, in their current form, they are generally incapable of interpreting human situations and thus dealing with ambiguities; they will usually make an error as a result. Difficult problems occur when decisions have to be made about the structure of information for a database. This paper arose from the need to classify lighthouses for a database, so, besides discussing in detail the types of structures that could be called lighthouses, it also proposes some definitions for associated terms, so as to facilitate a consistency in the information that will then allow a logical interrogation of the data. In doing so, we must accept that readers may never be able to agree entirely...

Navigational Aids

In the dark past, it was realised that:

- The seas and oceans of the world are dangerous places;
- Efforts must be made to improve the safety of those who go to sea.

The all-embracing term that describes these efforts is the provision of 'navigational aids', or 'aids to navigation', as they are also known. It could be argued that a map or a chart is an aid to navigation, and so they are – graphical aids. The first use of marine charts is not precisely known, but they must have been used from earliest times.¹ In parallel with this graphical aid, lists of navigational aids have also been prepared, along with known hazards and instructions for their avoidance. In early English culture, these were called 'Rutters' or 'Sailing Instructions'. These have evolved today into the many books used by mariners under the heading of Nautical Almanacs or Coastal Pilots. A GPS receiver is also an aid to navigation, albeit an electronic one, whilst a sextant is a mechanical measuring device using optics. But when we use the term, 'navigational aid', we are usually describing any artefacts set up, either in the sea or on land, with the assigned purpose of assisting seamen in safe navigation. These artefacts can be either lit

or unlit. We are also describing artefacts that were made for other primary purposes.

Beacons

The use of the word 'beacon' is often juxtaposed with 'navigational aid', but they are not synonyms. In common English parlance, a beacon is a signalling device - the forerunner of the carrier pigeon or the telegraph - but not necessarily a navigational aid. The use of beacons, or hilltop fires – certainly in British history – was as a means of sending signals, usually for warning purposes, the approach of an invading army, for example, across large distances. They can be used in daytime or at night, but obviously are more visible at night. A typical dictionary definition of 'beacon' in the marine context is as follows:

Beacon: ²

1. A stake or other erection surmounted by a distinctive topmark, erected over a shoal or sandbank as an aid to navigation.
2. A prominent erection on shore which indicates a safe line of approach to a harbour or a safe passage clear of an obstruction.

However, in older days, fire beacons, on the tops of cliffs or hills, were used as a means of warning on the approach of danger. Thus, news of the arrival in English waters of the Spanish Armada in 1588 was signalled from Plymouth to London by a chain of such fires ignited as soon as the flames from the previous fire were seen. In fact, the news of the Armada's arrival in the Channel was brought as far north as York within 12 hours by means of beacon fires.

In the UK, there are many geographical features that bear the name of Beacon, for example, Dunkery Beacon, a hill in North Devon, England having a top that is visible for many miles. Such hills were named in historical times because they were used as prominent locations from which to make an easily visible signal. It is true that this would probably have been by means of a fire, but it is not a requirement. In 2002, a chain of hilltops, each in sight of the next, was used to light an unbroken line of fire beacons throughout the UK. Its purpose was to celebrate the Golden Jubilee of Queen Elizabeth II - nothing to do with navigation. However, it was inevitable that the use of beacons could be extended into aids to navigation and it is common to use the word 'beacon' to refer to such aids. Note that a beacon does not have to be lit. It can be any artefact visible or recognizable at a distance for whatever purpose. This paper will discuss all those beacons that are navigational aids. However, all beacons are not navigational aids and all navigational aids are not beacons. Figure 1 is a diagram that shows, in a mathematical form known as a Venn diagram, the relationships between various aids to navigation, as discussed in this paper.

Towards a Definition

It would be natural to look to official publications for clarification of navigational terminology. The United Kingdom Hydrographic Office publishes definitive information about all aspects of navigation. Under the general title of Admiralty Charts and Publications, the Admiralty List of Lights and Fog Signals (ALL) is the primary source of data regarding the world's lighthouses. The ALL is subdivided into 12 regional volumes, A to M (excluding I). Whilst providing all information necessary for identification of lights, it does not distinguish lighthouses from amongst the large number of lightstructures listed. It does, however, accept that the term 'lighthouse' is a generally accepted description, but, clearly, it is not necessary to be able to distinguish a lighthouse from any other kind of lightstructure.

We are left to ask the question: What is a lighthouse?

The answer to this question matters a lot in some instances. From 1992, the Lighthouse Society of Great Britain offered a free information service. From its inauguration, one of its objectives was to build a database of lighthouses of the world. In 2005, the group's publication, the Lighthouse Encyclopaedia, was in its eighth edition with 13,000 database entries. The publication was inaccurately titled because it contained far more than just a list of lighthouses, but from the database, it was possible to instantly retrieve the numbers of lighthouses according to many different criteria.

What are the criteria for deciding whether a structure is or is not a lighthouse? It is an apparently

innocent question, yet, because of the inconsistencies of usage I have already alluded to, it is impossible for one 'expert' to provide an exact answer to a question that, in the English language at least, could not be argued against by another 'expert'. It is not possible to unambiguously answer such questions as, "How many lighthouses are there in Canada?" or "What was the first lighthouse ever built?" The author was faced with answering the second question when writing a book.³ The solution, as many have discovered before, was to write about an early lighthouse – the Pharos at Alexandria.¹ This structure is one of the Seven Wonders of the Ancient World, a fact that might lead to the conclusion that it was quite unlike anything that had gone before. Was it, therefore, the first lighthouse? We can, with certainty, say only that it was the first lighthouse about which there is no doubt of its existence. Surely, there must have been similar, but lesser, structures preceding it to act as design templates? The inclusion of the Pharos in the list of Seven Wonders was surely made on the basis of its grandeur and magnitude, rather than its innovation in function.

In answer to the question as to which was the first lighthouse, we are forced to conclude that we are unable to provide an answer that is not fuzzy, especially without a clear definition of what we mean by the word 'lighthouse'. Neither can we give an exact number for the total of lighthouses in Canada – or anywhere else, for that matter. Yet that is what some of us are frequently asked to do.

The Statue of Liberty is often described as an American lighthouse,⁴ a statement that brings great surprise to many. In fact, the US Light-house Board officially listed the Statue of Liberty as a lighthouse for a period of about 15 years (1886-1902). In 1877, Congress authorized the President to accept the Statue from France and to maintain it as a beacon. It was dedicated by President Grover Cleveland on 28 October 1886 and a little over two weeks later was turned over to the Board. It was first lighted on 22 November 1886, and remained in use as a lighthouse until 1 March 1902. In this unusual example, the role played by the Statue of Liberty in American culture is of far greater significance than that of a mere lighthouse. However, it could also be argued that the values associated with the Statue of Liberty are the very same values that bring warmth and comfort to most people when they think of lighthouses in general. It should therefore be possible to devise a definition of a lighthouse that includes such a structure.

Consider the question, "What lighthouses are there in New Brunswick that I can visit?" If, whilst working for the New Brunswick Office of Tourism, we recommend that a person should visit a certain location, we want him to be pleased when he makes the effort and goes there, especially in cases where great distances must be travelled. It is possible for entire days of precious vacation to be wasted! On the other hand, we do not want the lighthouse explorer to report back after his vacation and angrily say, "Why didn't you tell me about the lighthouse at Caraquet?"

From the point of view of tourist information – or, indeed, heritage, in general - not only are we unsure what structures to place in the category of 'lighthouse', but we are unsure whether the prospective visitor will be able to get close to it, inside it, or, in the case of offshore rock lights, whether a boat is needed. It might be OK for some tourists to hire a helicopter, but not for most of us! So, the provision of good tourist information is beset with difficulties. Leaving aside the use of the term lighthouse in the context of navigation, a clear and consistent definition is also important in the wider social context.

A New Definition

It would be natural to turn to a dictionary for a definition of the word 'lighthouse'. The Oxford English Dictionary reads: "A tower or other structure, with a powerful light or lights (originally a beacon) at the top, erected at some important or dangerous point on or near the sea-coast for the guidance of mariners." Most pharologists would find this definition inadequate, for it makes no attempt to describe the structure itself or to distinguish between the many possible forms such a structure might take.

Rowlett⁵ offers this definition:

A lighthouse is a lightbeacon having a height of at least 4 metres (13 feet), and a cross-section, at the base, of at least 4 square meters (43 square feet).

As Rowlett writes, "This simple definition does not require that a lighthouse have any particular form or appearance. The structure may be enclosed, partially enclosed, or completely open." This is clearly a valid opinion that provides a workable solution to the question of what is a lighthouse. However, it is an answer with which this author disagrees.

In the past, lighthouse historians have tended to establish a close association between the development

of lighthouses with keepers (and lightships with crews) and the history of nation building. This is not felt to the same degree in countries where the nation was very much built before lighthouses. In the North American tradition, other types of lightstructures are often not considered to be true lighthouses because they played no social role and the idea of the light station becomes the most important concept. In contrast, the English (as opposed to American) language concept of the lighthouse itself is the most important, and use of the term 'light station', and also 'light tower', is quite limited. It could be argued that the definition of a lighthouse as any kind of structure bearing a light is much too permissive. Rowlett's definition falls into this category. On the other hand, if preservationists consider only the structures associated with historic light stations to be lighthouses, this seems too restrictive. Inspection of some sample photographs provided below is recommended.

A good definition needs to include the form of structure. Certainly, it must embrace the notion of a human tending to or maintaining the light from within an enclosure – whether that is the entire structure or just the lantern itself. Thus, lighthouses can be towers that are not fully enclosed but have an enclosed portion - a central tube or column, whether cylindrical or square in section – and/or an enclosed room at the top that serves as a watchroom and protects the keeper from the elements whilst operating or maintaining the light. It should be pointed out here that many lighthouses no longer have keepers, but the argument is valid for a visiting maintenance engineer.

The definition of a lighthouse proposed here is therefore:

“A fully or partially enclosed built structure bearing a light that is used as a navigational aid and that is capable of admitting at least one person to operate or maintain the light entirely from within.”

Some itemised comments are now relevant:

1. A lighthouse does not float, although it can be in the sea or on land.
2. No particular shape or appearance is required, but completely open structures should not be included. Simply, they do not accord with what most people would call 'lighthouses'.
3. We argue here that it is only if such a light is officially recognised as an aid to navigation by the appropriate national authority and included in the respective national list, that it can be described as a lighthouse.
4. By definition, a lighthouse is lit, although we impose no restriction upon the number of hours that it is lit. Indeed, some lighthouses in the UK are now lit for 24 hours per day, whilst others, in Scandinavia for example, are lit only for certain months of the year.
5. This definition does not apply to structures that were used in this way in the past and may now be unlit or totally destroyed. To allow for the fact that important structures such as the Smeaton Eddystone tower are not included in the definition of a lighthouse, we propose to include the term, 'historic lighthouse' for those that were once lighthouses, but are now unlit, damaged or demolished.
6. We assume that where a light is part of the structure, it is likely to be used at night; it is not sensible to consider a structure that is lit only by day.

Some might argue that a structure to be designated as a lighthouse should provide its keepers with living accommodation. This definition would exclude some splendid structures that many people would naturally wish to call lighthouses, but where the keepers lived, not in the tower, but in a house nearby. Conversely, there are structures that many people would not call lighthouses, where keepers lived nearby. And what constitutes 'nearby'? On a defined plot of land? A mile down the road? It is difficult to see how these contradictions can be simply resolved. In the word 'lighthouse', the sub-word 'house' is itself ambiguous, for it can be used as a noun and a verb. This possibly explains why the concept of people living and working 'on-site' has become the more important concept than the importance of the navigation aid itself.

In other languages, there is a good international consensus on the different functions that different lights fulfill: headland lights, coastal lights, harbour lights, hazard lights, leading/range lights etc, but it is the sub-word 'house' that biases the mental image that English-speaking people have of these structures. The idea that a lighthouse should contain a house (noun) for living accommodation simply adds a layer of complication. There are many lighthouses, which are houses (noun) in the usual sense of the word, and which show lights from a window or some other small point on the building. They would not normally be

described as lighthouses, but they are certainly used, and therefore definable, primarily as navigational aids. The idea that a keeper actually lived on the premises with his wife, raised a family and grew vegetables is not an essential part of the definition of a lighthouse. Therefore, it has been decided in this paper that the definition should not include any specification as to whether humans were actually given living accommodation in or adjacent to the structure. It is the operation and maintenance of a navigational aid that is important.

To satisfy our mental image of a lighthouse, it is very important that humans should be able at least to work within, rather than merely outside of, the structure. This is a level of structural distinction that retains the human element, and includes all the structures that most people would wish to see included in a list of lighthouses. It widens the list to include open metal framework structures, but this is a small price to pay in order to have a consistent (and simple!) definition of a lighthouse. The definition we propose is also logical in view of the broader meaning of the verb 'to house' as 'to enclose', rather than 'to accommodate' (in the domestic sense) a person. In recent years, it has become popular for individuals to construct replica lighthouses (sometimes described as follies or faux) on their domestic property and to go to great lengths to make them as close as possible to the 'real thing'.

Thus, it is possible to improve upon the definitions currently in use, especially when serving the needs of creating consistent data for a database. We shall now try to give sensible meanings to other definitions, with the aim of extending our knowledge structure for a database of lighthouse information.

Lightstructures

From the above discussion, we observe there is no single word to describe a built, lit structure. The options available involve the juxtaposition of 'light' with such words as tower or structure. We believe it is important to use a word in which the two words are joined. Modern English has no consensus on the joining of words. For example: sea water, sea-water or seawater – which is correct? In fact, all of these are correct and distinctions are made only to satisfy a publisher's 'house-style'. However, the computer on which this is being typed insists that the first of the three options is incorrect! The same computer does not object if I type 'light house' or 'lighthouse'. This is because the software is presently unable to determine the meaning I am trying to convey. The word 'lighthouse' has not, in modern times, been written as 'light house', although in earlier centuries it was occasionally written as 'light-house'. Thus, the 19th century US Lighthouse Agency was the 'U. S. Light-house Board'. The use of a hyphen has been seen by many as being a precursor to the formal joining of two words. In recent times, for example, the words 'data-base' and 'knowledge-base' have evolved into database and knowledgebase. This joining of nouns to make 'complex' nouns, as are many matters associated with an evolving language, is a question of use, debate, and context, and is not always consistent. However, it has become common in the latter half of the 20th century, possibly encouraged by the use of computers, but more probably demanded by the rapid advances in technology, to join nouns (but not adjectives) together in this way. Not only is it an aid to clarity of interpretation, but it assists in eliminating the kind of interpretational errors discussed earlier. Yet, the use of 'lighthouse' is in contrast to 'light tower', 'light structure' and 'light station'. The reader should note that, throughout this paper, where a term is made up of two 'sub-words' we use the joined version. Thus, we propose here to use the word 'lightstructure' to mean a built, lit structure. The two words are merged so as to conform to the equivalent 'lighthouse' - a matter that we maintain is non-trivial in the context of electronic information.

Classifications

Formally published lists of lighted navigational aids date from the nineteenth century. Amongst the earliest was an Admiralty List of Lights published in 1832 that dealt only with lights in the British Isles. As early as 1847 the publication had been extended to cover North American lights, although this included only British North America. Starting in 1861, Alexander Findlay⁶ published an annual series of light lists that are regarded by some as more inclusive and systematic. It was not until the late 18th or early 19th century that various national bodies formally took charge of lighted navigational aids with authority vested in them by their governments. In time, these bodies published their own detailed lists of navigational aids within their own jurisdiction.

Today, there are several publications that provide lists of information about navigational aids on an International Basis. In the USA, the National Imagery and Mapping Agency (NIMA) publishes such a list in

six volumes⁷, as do the French Service Hydrographique et Océanographique de la Marine⁸ and the Royal Navy in its Admiralty List of Lights and Fog Signals, abbreviated here as ALL⁹. Similar publications are published in both Japan and Russia. The current ALL is in 12 volumes, A to M (excluding I), and covers the entire coastline of the world where it is associated with seawater. It does not include fresh water lights, so the Great Lakes of the USA and Canada, for example, are not included, neither is the IJsselmeer in the Netherlands. It is interesting to note that there is no ALL Volume I, because of the ambiguity for a human between three parameters: the printed symbol for a letter I, a Roman numeral I or a number 1. Since the alphanumeric I is used for both the letter and the Roman numeral, the computer cannot distinguish between them, although it can easily distinguish between an I and a 1 (providing the human keys in the correct symbol). There are many examples in which mixed number-letter combinations demand that certain symbols are not used because humans (not computers) get them confused. Again, I and 1, together with O and 0 are the prime culprits.

Every item listed in the ALL is a navigational aid bearing at least one light. Each entry is allocated a unique number that is internationally recognised and almost never changed. National lists may have different identification numbers. When a light is discontinued, the number is dropped from the list. In some cases, it may be reassigned later to a new navigational aid established in the same vicinity, but as a rule, new numbers are created when new navigational aids are put in place. These designations are extremely useful for the purposes of cataloguing the lights of the world, since modern methods use databases that rely upon unique identity tags. Readers of the ALL are not, however, able to identify the entries that relate to lighthouses, underlining the point that entries in lists of lights are concerned with their importance as navigational aids, rather than the annals of social history. By definition, the ALL, with its title, List of Lights and Fog Signals, is not a list of lighthouses, nor does it attempt to differentiate or specify what should be regarded as a lighthouse. It does attempt to distinguish major lights from minor lights by use of a bold font when the light is visible for 15 nautical miles or more, but this is because of their importance as lights, not for any architectural significance. There is no way of identifying lighthouses by studying the ALL. There are many beautiful structures of interest to pharologists that are recorded as visible over distances far less than 15 miles and which are not easily distinguishable from other navigational aids having little architectural significance.

The ALL contains a field entry under the heading of 'Description', from which you might think it possible to identify those records of lighthouses. Analysis shows that there is no consistency in the descriptions given. Therefore, by the standards set in this internationally recognised and authoritative publication, there is no unambiguous method used to describe a structure.?

Table 1 gives a list of sample descriptions used. Each description is comprised of a number of words that are combined to describe the entry. These can be broken down into a number of elements: colour, construction material, shape, and element. If we exclude the adjectives from the description and focus on the noun applied to the lightstructure, we find such words as: tower, column, pole, tripod, house, hut etc. Notable by its absence is the word 'lighthouse'. The structure might consist of a tower and a building or a tower on a building. It might be a tower with a red lantern or a tower with a red cupola or a tower with a red top. We believe there is no intrinsic difference between these and when the description is tower with red top, it could be either a tower with a red lantern or a tower with a red cupola – i.e. the lantern or cupola being on top of the tower - or a tower with the top part of the tower painted red (but with the lantern of a different colour?) In this way, you can see that the contents of the description field are, again, ambiguous or fuzzy, and not therefore reliable descriptors.

You might consider a church steeple or any other prominent building to be a navigational aid, for if it can easily be recognised from the sea then it assists the mariner in knowing his location. Indeed, such landmarks are shown explicitly on marine charts, and in texts known as coastal pilots, that are popular with sailors today. While these structures were not built specifically to act as navigational aids, they may have been given a light so that they could serve as an autonomous light or as a rear leading light. The St Phillips Episcopal Church in Charleston, South Carolina, was listed in some international and national lists at the turn of the twentieth century, but is not included in official lists of lights today. However, some lights of this type are officially listed today. In the ALL, Beauvoir (G1139) is a church in Argentina, as are Puerto Bolivar (G3029) in Ecuador and Kihelkonna Rear (C3715.1) in Estonia, for example. In addition to churches, other buildings have been used in this way. The Hibernia Bank building in New Orleans was listed for a few

years after WWI, and actually had a lantern on its roof. The Kingsborough Community College in the New York City area is still listed by the US Coast Guard. The Titanic Memorial Lighthouse, also in NYC, was listed from 1913 to 1967¹⁰ when it was located at the Seamen's Institute – it is now at the South Street Seaport. Other structures that act as aids to navigation are bridges with lights to mark a channel into a harbour, or in a river, as well as offshore oil and gas production platforms in the North Sea, the Gulf of Mexico, or the Arabian Sea, for example. Among the more unusual structures listed is H0026, a light shown from the top of a grain elevator in Churchill, Manitoba.

Daymarks

In the definition of a navigational aid given above, there is no distinction between night and day. Plenty of navigational aids exist which provide guidance in daylight, but which are unlit. These are termed daymarks. A navigational aid built today would be designed to be visible both by day and by night, and would therefore be lit, at least by night. In many countries, designs specifically include brightly coloured geometrical figures – stripes, bands, squares etc – painted on rectangular, square, triangular or pyramidal boards for maximum daytime visibility. To enrich our terminology, we propose that the term 'daymark' is used to apply to any built, unlit navigational aid, whether or not it actually bears a light, for it is clear that when a historic lighthouse or lightstructure is unlit, then it is also performing the role of a daymark.

Figure 9 shows a daymark at Hill Head, near Lee-on-the-Solent, Hampshire, UK. The structure can be described as a wooden framework tower with a white horizontal band and an orange mark. It is simply a positional device. A much more permanent and well-known daymark in Cornwall, UK, is the one at Gribbin Head, near St Austell, shown in Figure 10. This large structure marks a prominent headland. Figure 11 shows a much smaller built, unlit structure that serves to mark minor hazards along shorelines. From Figure 1, we see that these structures are navigational aids that are built and unlit.

Floating Aids

For the purposes of the lighthouse database, it could be argued that it is not necessary to define or develop these definitions, but inevitably, the overlap of interest in lighthouses and lightships (there are many books having this title) means that we must apply some consideration to this topic. The most obvious equivalent to a lighthouse is a lightship (or lightvessel). A definition is readily forthcoming that is in direct parallel to the lighthouse and is given in Table 2. However, there are other structures that do not fall into this category. We summarize these as LANBYs, lightfloats and lightbuoys. Again, definitions are given in Table 2. Whilst, there is no doubt that there is a clear distinction between a lightship, and a LANBY, it is not so clear about the differentiation between lightfloat and lightbuoy. We consider there to be very little difference between them, but we do allow the possibility of them having a different design and construction.

Figure 12 shows a floating, moored, lit lightbuoy of the cardinal type. This means that it indicates a point of the compass. In this case, the two downward facing arrows on the top indicate a hazard to the south of the buoy. They are always black and yellow. It has a solar-powered flashing light.

When we consider all those unlit objects afloat in the seas that might be included in the term, navigational aid, there are many possibilities. Of course, there are many floating artifacts that are not navigational aids. We believe, the great majority of these can be described as buoys or marks, where the two are distinguished as follows:

A mark is defined as a floating artifact on which there is some kind of pole with an indicator of some kind (cross, arrow, triangle etc)

A buoy is a floating can (round, square or cylindrical) without such an indication.

As it is not intended to include these in a lighthouse database, it is not proposed to develop this definition any further.

Summary

A logical structure for the definition of terms describing some navigational aids has been developed and explicitly defined. It has been argued that the long history of navigational aids has resulted in an inconsistent use of certain terms and that difficulties arise when attempting to build logical structures to contain database information. Adopting a revised system of nomenclature solves the problems raised when attempting to classify navigational aids in a logical system. It is accepted that complete agreement of all interested parties over such a scheme will never be possible, but that the proposed system offers the prospect of consistent data when shared between those who agree to use it.

Acknowledgements

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Table 1: Some descriptions of lightstructures and lighthouses

Brown 8-sided concrete tower, with white top half of the tower.
Brown round stone tower, with red lamp on top
Grey concrete tower, with black and white top
Round metal tower
Round stone tower, with red and white horizontal bands
White 6-sided metal tower, with black base
White 8-sided tower
White 8-sided tower on a white building
White lantern on a white round building.
White metal framework tower, with red top
White round castellated tower
White round castellated tower, with black horizontal bands
White round concrete tower, with black vertical stripe and white marker
White round metal tower
White round stone tower, with red lantern
White round stone tower, with white buildings
White round tower
White round tower, with red horizontal band
White square tower, with black horizontal band
White square tower, with red horizontal bands
Yellow metal framework tower
Yellow metal tower

Table 2

Beacon: Any artefact, built or floating, visible or recognizable from a distance, whether by land or sea, that is specifically intended to provide a signal or warning for any purpose not exclusive to navigation.
Navigational aid: Any artefact set up, either in the sea or on land, whether built or floating, with the specific purpose, whether primary or otherwise, of assisting seamen in safe navigation. A navigational aid can be lit or unlit and may or may not have an audible signal. When floating, it is always moored in a fixed position.
Lighthouse: A fully or partially enclosed built structure bearing a light that is used as a navigational aid and that is capable of admitting at least one person who can operate or maintain the light entirely from within. A structure that was once a lighthouse and is now unlit is a historic lighthouse.
Lightstructure: A built structure bearing a light that is used as a navigational aid. All lighthouses are lightstructures.
Daymark: Any unlit, built navigational aid.
Lightship: A floating lit navigational aid that is of sufficient size for it to accommodate at least one person.
LANBY (Large Automatic Navigational Buoy): A large floating lit navigational aid that possesses telemetry systems, but is not of sufficient size for it to accommodate a person.
Lightfloat: A floating lit navigational aid that has no telemetry installed and is not of sufficient size for it to accommodate a person.
Lightbuoy: A small floating lit navigational aid.
Buoy: A small floating unlit navigational aid that is typically can or cone shaped
Mark: A small floating unlit navigational aid that is typically a pole with a marker mounted on top in a variety of geometrical shapes.

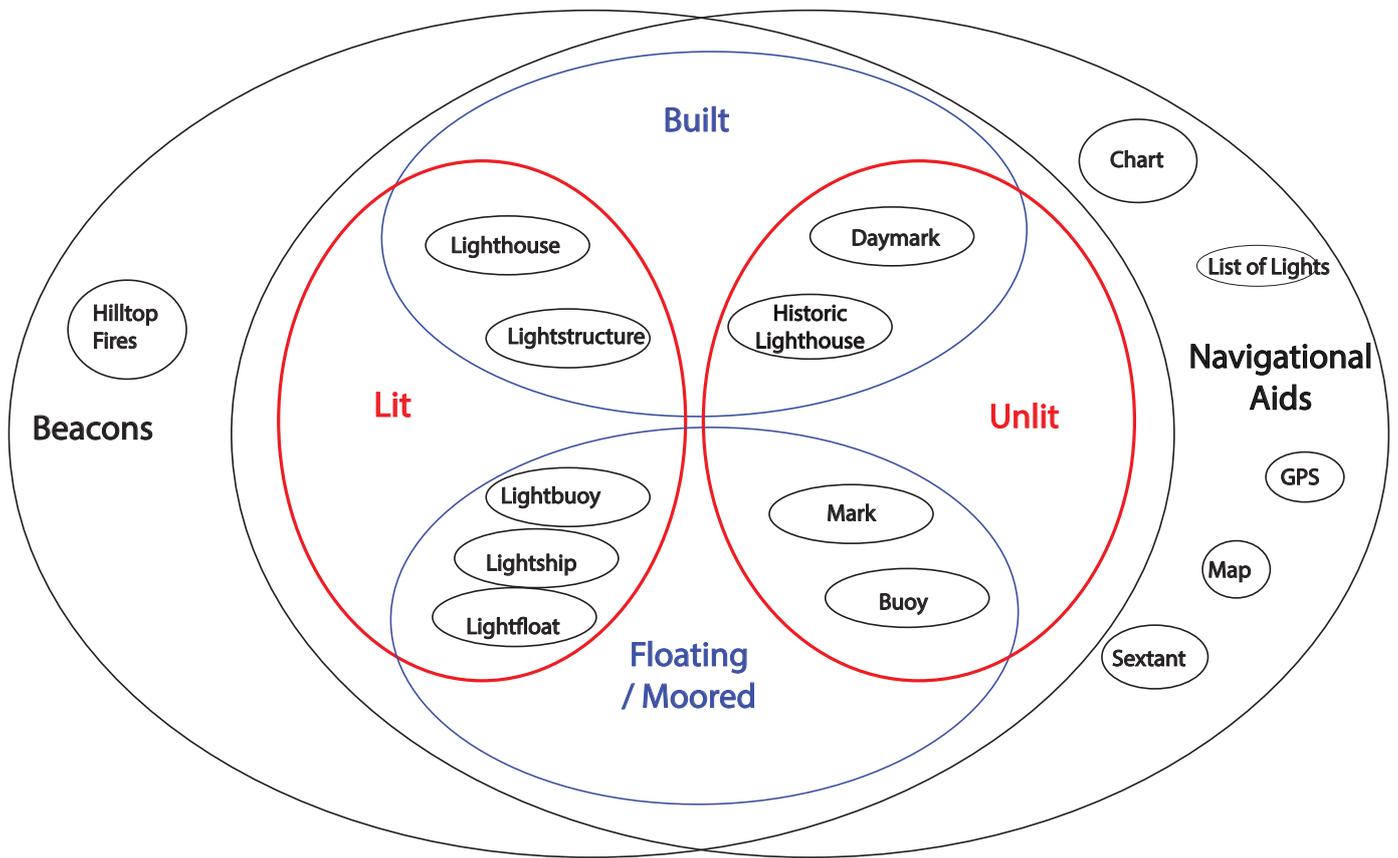


Figure 1: A Venn Diagram that considers modern navigational aids in terms of their visual properties. Those structures that are both lit and built are lighthouses and lightstructures. A historic lighthouse is unlit.



Figure 2: In the distance, the lightstructure known as Plymouth Breakwater West End (A0114) conforms to everyone's idea of a lighthouse. In the foreground is Maker lightstructure (see Figure 3).



Figure 3: The lightstructure at Maker (A0112), shown in the foreground of Figure 2, is a white concrete tower with a red stripe and shows a sector WRG light. It does not fit the criteria given here for a lighthouse.



Figure 4: This structure, Elie Ness, Scotland (A3060), is a built, lit, navigational aid. Its lantern was removed and the present light added. It is a fully listed, functional, lit and built aid to navigation. In this form, however, it is not a lighthouse.

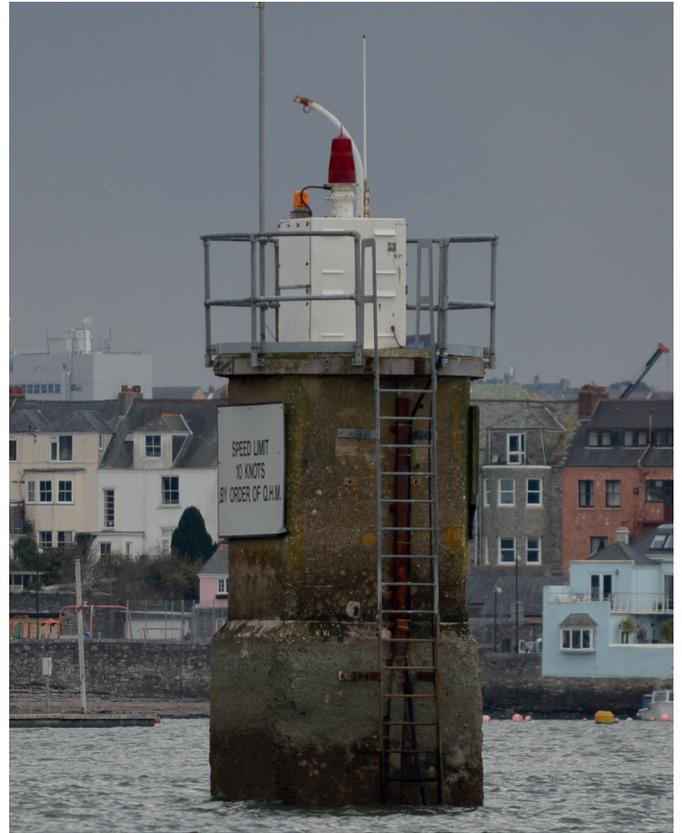


Figure 5: This photo shows the Cremyll Shoal (A0176). It should be designated as a lightstructure, but not a lighthouse.



Figure 6: These four lightstructures (two red, two green), (A0173.1, A0173.2, A0173.3 and A0173.4) mark the safe channel in an area of shallow water. They have platforms for maintenance, but are not lighthouses. The ALL describes them as piles.



Figure 7: A navigational aid at the entrance to Fowey Harbour, UK. Described in the ALL as a lamp box (A0083) it is, clearly, a lightstructure.



Figure 8: The Smeaton Eddystone Tower clearly conforms to anyone's definition of a lighthouse, but is no longer a recognised aid to navigation, although it is lit with candles for special occasions. We propose to list it as an historic lighthouse.



Figure 9: A daymark at Hill Head, near Lee-on-the-Solent, Hampshire, UK

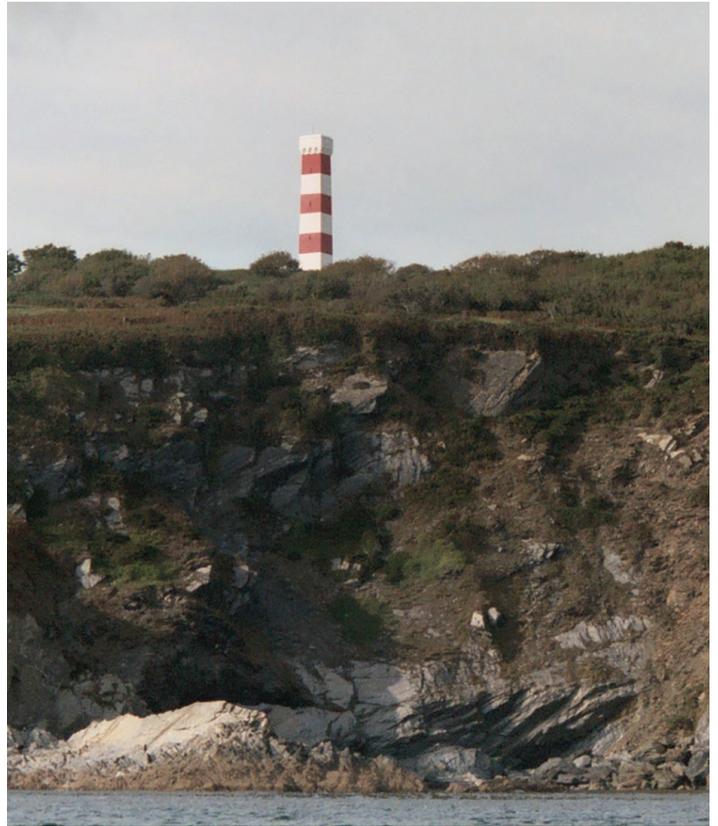


Figure 10: This large daymark at Gribben Head, is visible over great distances in Cornwall, UK.



Figure 11: This daymark is built and unlit, and an indication of the position of a minor navigational hazard.

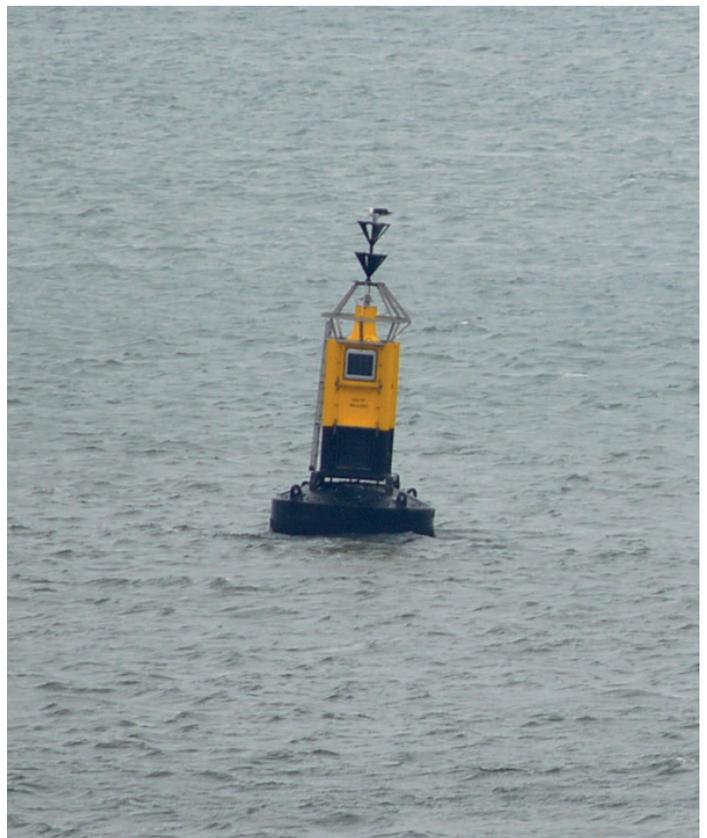


Figure 12: A cardinal buoy is moored, floating and lit.

Notes

- 1 Ken Trethewey: Ancient Lighthouses, Jazz-Fusion Books (2018). ISBN: 9780992657369.
- 2 Kemp P, ed., The Oxford Companion to Ships and the Sea, Oxford University Press, 1976.
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- 4 Holland F Ross Jr, America's Lighthouses, An Illustrated History, 1988, Dover Publications, USA.
- 5 Rowlett R, The Lighthouse Directory, <http://www.ibiblio.org/lighthouse/index.htm>.
- 6 Findlay A G: A Description and List of the Lighthouses of the World, Richard Holmes Laurie, London, UK, 1861.
- 7 Lists of Lights, US Coast Guard, <https://www.navcen.uscg.gov/?pageName=lightLists>.
- 8 Livres des Feux et Signaux de Brume, Service Hydrographique et Océanographique de la Marine, Paris, France, <http://www.shom.fr>.
- 9 Hydrographer of the Navy: Admiralty List of Lights and Fog Signals, HMSO, Taunton, UK .
- 10 Crowley J: Lighthouses Of New York: Greater New York Harbor, Hudson River And Long Island, 2000, 128pp, Hope Farm Press, Saugerties NY, USA.