TRANSPORTATION-MARKINGS DATABASE: MARINE

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Part Ii, Second Edition

Volume III, Additional Studies

Transportation-Markings: A Study in Communication Monograph Series

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Mount Angel Abbey 2007

Dedicated to my Grandparents:

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Frederick William Sauers, 1869-1944

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PREFACE

Part I, *Transportation-Markings Database*, draws together the various dimensions of Transportation-Markings. It shares this drawing-together function with Part H, *T-M General Classification.* But -- perhaps paradoxically -- it draws together by focussing on the individual entity: each Transportation-Marking. The Database demonstrates the unity and commonality of the Markings but presents each one in its separate state. Yet in that process the full panopoly of Transportation-Markings is unfolded including their connected state.

There are thousands of Transportation-Markings. In addition there are many variant forms, alternative names, untold permutations. The sheer number of forms may obscure the common thread of T-M that interweaves the multiplicity. Yet ultimately the multiplicity leads to the basic unity of safety aids of whatever kinds. The variety and diversity points to a restricted system of messages serving one essential purpose: the promotion of safety. The perpetual conundrum of the one and the many is found here in T-M. And the one and the many interact and explain each other.

The T-M Database examines the four modes of rail, road, aero, and marine T-M forms in separate studies though all of the studies remain integral units of Part I. The amount of work required to prepare the study precludes assembling all four modes of T-M in a single monograph. The first edition of the marine study was published in 1997.

There has been some confusion over the meaning of Transportation-Markings. Some users have interpreted the term as constituting a synonym for Pavement Markings. This is not the case. T-M is a general, overarching term for all types of T-M forms. This perspective is reflected by the Library of Congress which employs T-M as a general heading in its Subject Headings. The Library of Congress includes various specific kinds of T-M under that heading including pavement markings. In order to reduce confusion over the meaning of T-M a hyphen has been added to the words Transportation and Markings thereby created a conjoined term. This results, hopefully, in an image of T-M as a single and unified concept thereby reducing misunderstanding over the meaning of the term,

and especially of mistaking T-M with one of its constituent elements. The conjoined term encompasses all communication forms for safety external to transportation vehicles.

Frederick Crewes in his *Random House Handbook* (1977) notes that new compound nouns are often hyphenated. Such a practice signals to users that the resulting term is a unit not two independent words existing side by side which can be split apart without significant results. Developed compound nouns may retain the hyphen, may become a single non-hyphenated word or exist side by side without the hyphen without losing its essential character. Transportation-Markings will probably require the hyphen in a permanent state. Regretably, only after a dozen years did it become apparent how much confusion the term Transportation Marking could generate and especially without the hyphen. Hopefully, a clearer, more emphatic Transportation-Markings can result.

The entries of the T-M Database are based in many instances on a diverse range of sources. In addition, the writer's work in T-M over many years has influenced the entries substantially. This has meant that in not a few instances terms can not be tied precisely to a specific source. In other cases references are pointers to the literature of the field. And in situations where a term has many references, only a sampling of sources can be listed. More rare terms, however, can be linked with specific references.

T-M Database: Marine is based on the subdivisions of Floating Aids, Fixed Lights, Daybeacons, Fog Signals, and Radio Aids. There is no general chapter. Therefore, some chapters perform a dual role: they take up the terms of given category and they include topics shared with other chapters. Floating Aids includes a segment on general Marine Aids to Navigation terms, Fixed Lights contains Light Phase Characteristics, and Daybeacons includes Topmarks and Daymarks.

A major problem with the Database has been the role of the classification system in the Database. It was originally intended that an extensive integration of

classification and database entries would be feasible. However the first edition of the marine segment uncovered serious problems: The classification focusses on officially used entries and the classification draws together the entries. While the Database focusses on individual entries of many forms: official terms, past terms, variant and peripheral forms. As a result, employing the classification as a frame-work did not work well. Use of the classification after the marine study was discontinued. However, it now appears possible to make use of the classification though in a more limited manner. Instead of a precise classifying of entries a more modest batching of related terms under headings of major categories of the classification has been considered for this edition. However, reworking of the classification in the study requires further work. Nonetheless, general terms with classification designations can be viewed as encompassing diverse terms which allows many terms to be placed within the classification schema though in a more restricted manner.

Taxonomies are never finished. Each variation requires yet more changes. Over the years the T-M classification has been "revisited" many times. Yet more revisiting is now required to accomodate the batching of terms, as well as further changes in the classification system in itself.

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1B1 Overarching Terms

a) Basic Overarching Terms

BOYE/BWOY. These terms are historic forms of the term Buoy. Boye is an Early Modern English form that is a corruption of the Latin Boia. Bwoy is a 16th century usage that approaches the current form.
Reference: Langmaid 1966

BOUY. General Comments: Buoys are floating objects anchored to a sea, river or harbor bottom. The term encompasses Floating Aids except for Lightships, Large Navigational Buoys and other Major Floating Aids. Most buoys are metal though some plastic and fiberglass/grp are in use. Formerly, wood Spar Buoys were employed. Simpler buoy forms are essentially a floating tank with anchors. Lighted, Sound, Combination Buoys have superstructures; and oft times a tube beneath the tank. Battery or acetylene fuel sources are present with more complex Buoys; solar cells are replacing many of the traditional fuel facilities. No other term competes as a general term for these Aids.

Classification #: 1.
Form of Aid: Marine Floating Aid
Operation: A floating object with distinctive shape, color, and other symbols; may have light, sound, radio dimensions.
Comments: Buoy is the core term for these Aids and overwhelmingly so.
Reference: Virtually every Marine Aid to Navigation source includes Buoys to some degree. Sources include:
Adamson 1953, Corbin 1926, De Wire 1995, Johnson 1890, Pearsall 1990

BUOYAGE. The term refers to the system of Buoys employed along coasts and in harbors, and arranged in an agreed upon pattern and meaning. The primary system is that of IALA. The French term Balisage includes Fixed Beacons and Buoys. The English term Buoyage refers to Buoys only: the companion of Beaconage refers to Fixed Beacons.

Reference: Kerchove 1961, IALA 1980

BUOYANT BEACON. Langmaid refers to early Buoys under this term. Buoyant Beacons may suggest the Articulated Beacon in Fixed Lights.
Reference: Langmaid 1966

FLOATING AIDS. An infrequently employed term which can serve as an umbrella term for all Aids moored in the sea and in other bodies of water that include Buoys, Lightships and Large Navigational Buoys.
Reference: Bowen 1947

FLOATING BEACONS. This term has at least two meanings: It is employed by The Netherlands as an designation for some variant forms of Spar Buoys (which see). It is also employed as a synonym by Bradford for Buoys; that is the intended meaning here.
Reference: Bradford 1972

FLOATING MARKS. This term refers to Marine Aids to Navigation of a floating nature. They include Buoys, Lightships, Large Navigational Buoys. It is similar in meaning to Floating Aids. IALA refers to Floating and Fixed Marks as well as to Marks, Navigational Marks and Seamarks.
Reference: IALA 1970

MARKER/MARKER BUOY. Terms of confusion employed by Burton 1980 as synonyms for Buoys. Markers can have reference to many forms of Transportation Markings. Marker Buoys refer generally to a variety of specialized Buoys (often indirectly navigational). They are included here as a possible overarching term because of Burton's usage. Related terms may illuminate the use of Marker: Seamarks refers to the broad range of Marine Aids to Navigation/Aids to Marine Navigation. Mark can refer to Fixed and Floating Aids, Beaconage and Buoyage.
Reference: Burton 1980, Bradford 1972

NAVIGATIONAL BUOY. Navigational Buoys refer to Buoys whose function directly impinges on ship navigation. Other Buoys with more indirect ties to navigation are not so designated. For example, various Hazard Buoys are not

directly navigational in purpose. This definition and understanding of Navigational Buoys owes much to Kemp 1972.
Reference: Kemp 1972

b) Other Overarching Terms (Often Partial; Frequently Informal)

APPROACH BUOY. This is one element of Dutton's tripartite Buoyage schema. These Buoys are located between Sea Buoys in exposed locations and Harbor Buoys. Approach Buoys are found at the approaches to harbor channels. This is more of a morphological term. It is included here because it constitutes a primary unit of Buoys; it also has a physical character in this context.
Reference: Hill (Dutton's)1958

AUTOMATIC BUOY. Seemingly only Johnson 1890 includes this term. It may suggest a wave- actuated Sound Buoy yet his use of the term suggests that all Buoys are included. Perhaps he has in mind the independent, unattended character of Buoys.
Reference: Johnson 1890

BEACONING. UK 1861 introduces this term from the French Lighthouse agency. It refers to the organized effort of establishing and maintaining Aids other than Lighthouses.
Reference: UK 1861

DEEP-SEA BUOYS. Langmaid 1966 supplies this term. It suggests Sea Buoy, Ocean-Buoy or other large Buoys adapted to the open sea. It can be a morphological term but it also includes all Buoys of a certain class without reference to specific purposes.
Reference: Langmaid 1966

HARBOR BUOY. This is seemingly employed only by Dutton 1958. It refers, of course, to Buoys within harbor areas. Dutton has created a three-part classification of Sea Buoys, Approach Buoys, and Harbor Buoys. It has a morphological character yet it is physical as well since it includes all Buoys within harbor areas without regard to function.

Reference: Hill (Dutton's) 1958

METAL FLOATS. An unlikely term for overarching use. Metal Float strongly suggests a piece of a Buoy: the floating tank that is the central part (if not an entire physical structure) of a Buoy: Yet Adamson 1953 uses it -- probably in an informal vein -- as a synonym. Since that work is a major entry in the literature it is here noted and included.
Reference: Adamson 1953

OCEAN-BUOY/OCEANIC BUOY. These are informal terms supplied by Adamson. They appear to refer to large, heavy-duty Buoys that correspond to Exposed Location Buoys (USCG) and the "Major Channels-Moderate or Open Sea" class of Pharos Marine.
Reference: USCG 1964, Pharos Marine, Adamson 1953

SEA BUOY. Dutton 1958 offers a three-part classification of Buoys. Sea Buoys, the outermost element of that schema, are in exposed locations and presumably represented by large, very sturdy equipment. The term also has morphological dimensions. Harbor and Approach Buoys are the other elements of Dutton's schema.
Reference: Hill 1958

SEACOAST BUOY. A rather general term employed by Gibbs 1955. It may refer more to the physical entity than to morphology. Gibbs is apparently referring to Buoys termed Exposed or Most Exposed by USCG and employed in coastal locations. The Special Classification in this segment of the Database includes details on location configurations of the USCG and of Pharos Marine.
Reference: Gibbs 1955

SIGNALS. USLHS 1927 makes restricted use of Signals for some categories of Buoys. While the term is not employed extensively its partially overarching character warrants inclusion here.
Reference: USLHS 1927

UNLIGHTED BUOYS. Many Buoys are unlighted but only infrequently does

this fact become part of the Buoy name. This Buoy can be defined as one that lacks a light yet the Buoys is a positive entity and not merely an entity lacking some added element.
Reference: IALA 1970, Johnson 1890

c) Overarching Terms: Marine Aids to Navigation Mode

General Comments: These terms go beyond a specific form of marine safety aid. Some of these transcending terms are closely associated with specific forms and are assigned to those forms. Other terms encompass all or most of the transportation mode and need to be addressed together. This segment of Floating Aids Overarching Terms reviews those terms.

AIDS/AIDS TO NAVIGATION. This is the most inclusive term for all of Marine Aids. It includes visual, acoustical and radio safety aids. USCG notes that these Aids are outside or external to a marine vessel, thus omitting safety and navigation aids and processes internal to a ship. IALA 1970 appears to restrict the term to Visual Aids though, to be sure, the publication in question focusses only on Visual Aids. A variety of other terms in this segment also appear to include only the visual. Aids is the short form and workable in a maritime context. It appears in Part J and may reflect actual usage.
References: IALA 1970, USCG LL PC 1991, Part J

COASTAL AIDS/COASTAL MARKS. IALA restricts these terms to the visual and to coastal locations. The term may suggest a Major Light yet they transcend a specific form of Aid and can presumably include Major Lights, Buoys, and even Minor Lights and Daybeacons.
Reference: IALA 1970

FIXED MARKS AND FLOATING MARKS. These terms are largely restricted to certain segments of Marine Aids though some measure of possible general use is present.
References: IALA 1970

GUIDING MARKS. A contribution of Langton 1944. The term is possibly of a

restricted nature though it appears to be a plausible entry as a general, overarching term.
Reference: Langton 1944

LANDFALL MARK. USNOO includes both Lighthouses and Buoys in this term which thereby transcends an segment of the transportation mode. Its coastal location may favor significant Fixed Light.
Reference: USNOO 1969

LANDMARK. A broad term that often includes natural terrain, buildings and other visually prominent features employed by mariners. It can also have a specific Aid to Navigation meaning that appears to be the meaning for IALA. Though IALA does not exclude the unofficial and informal kinds of Landmarks.
Reference: IALA 1970

LIGHTED MARK. This term from Chapter 2 can beincluded here since it encompasses portions of Floating as well as Fixed Lighted Aids.
Reference: Naish 1985

MAJOR AIDS. A term in Part J. It is influenced by the literature though not lacking references.
Reference: Part J

MARK. Both IALA and LN employ the term as an overarching concept for Fixed and Floating Aids within the respective Buoyage Systems. It suggests a Buoy, Daybeacon or Minor Light. Seamark is a broader term that can include many forms of Aids but suggests a leaning toward Major forms. While the simple term Mark may tend toward Minor forms.
References: IALA 1970, LN 1936, H & C 1975

MARKER. A term of only limited usage. Langmaid uses it as a virtual synonym for a Major Light. Other sources refer to a low-powered Radio Beacon known as a Marker Beacon or simply a Marker. The term offers the possibility of broader employment though the evidence for its usage remains sparse.
Reference: Langmaid 1966

"MARKS AND SIGNS FOR THE SEA." This phrase -- which belongs to Trinity House -- dates back to the 16th century. Even though dated it may offer a worthwhile summing up for the full panopoly of marine safety Aids.
Reference: Langmaid 1966, UK 1861

NAVIGATION MARK. IALA 1970 attempts to define key terms by grouping together similar terms including variant forms. This term, the first term for a general Visual Aid, is an example of that practice. The terms include Mark a variant form, Navigation Mark. Aid, along with variant forms of Visual Aid, Visual Aid to Navigation and Aid to Navigation, are also included. Finally, Seamark is added to the assemblage. It can be debated whether all of the terms are visual in character.
Reference: IALA 1970

NAVIGATIONAL AID. A term of some confusion. US sources (including USNOO and USCG) exclude Aids to Navigation from this term. The term, instead, refers to internal aids aboard ship. But in UK practice the term is interchangeable with Aids to Navigation. UK maritime literature often refers to Navigational Aids with the meaning assigned to Aids to Navigation in the US; this may have created confusion as to what it refers to.
References: USNOO, Langmaid 1966

SEAMARK/SEA-MARK/SEA MARK. This term, and variants, is a central term for various forms of marine Aids. Though the term seems to favor visual forms. Hague & Christie prefer Beacon to Seamark which may suggest an Unlighted Aid though a more encompassing meaning is probably present.
Reference: Hague & Christie 1975

SHORT-RANGE AIDS/SHORT RANGE AIDS TO NAVIGATION/SHORT-RANGE AIDS TO NAVIGATION. This term refers to Aids of limited receiving range that include visual, acoustic, and electronic forms. Keeler includes a hyphenated form.
Reference: APN 2002, Keeler 1987

VISUAL & AUDIBLE AIDS TO NAVIGATION. A term of an easily understood meaning. The third "leg" of Marine Aids, that of electronic, is not included.
Reference: APN 2002

Curious Terms:

MARINE SIGNPOSTS. Phillips 1949 includes this informal colloquialism for Aids to Navigation. It may suggest a truth about Marine Aids that more formal and conventional terms lack.
Reference: Phillips 1949

OCEAN LAMP-POSTS. A second offering from Phillips 1949 that is yet more curious. Other marine writers also indulge in applying non-marine terms to maritime matters. Perhaps this is done to avoid staleness or to attract attention. Some value may be found in the practice if the familiar (Signsposts and lamp-posts) are applied to entities less familiar and thereby providing a useful analogue.
Reference: Phillips 1949

WANDERING BUOYS. Wesler's term for Buoys that become adrift from their assigned positions. Anecedotes of long-distance and near global travels are included in his description of Wandering Buoys.
Reference: Wesler 1966

1B2 Lighted Buoys

ACETYLENE BUOY/ACETYLENE GAS BUOY. Terms for Lighted Buoys powered by gas. Lack of the word "Light" does not negate their character.
Reference: Wesler 1966

AUTOMATIC ELECTRIC BUOY. A term for a historic form (or proposal for an Aid). A sea-activated dynamo was intended to create electricity for the Buoy light.
Reference: EB 1911

LIGHTED BUOY.

General Comments I. This is the most common term for this form of Aid. It seems plausible to think that the term Lightbuoy or Light Buoy would be more in keeping with other Marine Aids terms (e.g., Sound Buoy or Sound Signal) yet Lighted Buoy is the overwhelmingly employed term. Lightbuoy is rarely employed and is, in fact, a relatively recent term; Light-buoy constitutes a variant form.

General Comments II. Older terms for Buoys with a light often included the energy form incorporated in the name; for example, Oil Gas Lighted Buoy, Gas Buoy, Electric Buoy. These terms though historical form a subgroup within Lighted Buoy forms.

General Comments III. Light Buoy is not a monolithic entity: the name tends to encompass -- and obscure -- a wide diversity of forms. LN and IALA versions are of a common design differentiated by conical, can, or spherical shaped superstructures. A variety of nations with unique forms may not employ the conical/can/spherical terms at all. Combination forms include light and sound dimensions and are considerable separately.
Classification #: 12
Type of Marking: Marine Floating Aid
Operation: It is the equivalent of a land-based Aid with light mechanism, light phase facility and power source (solar cell, battery, acetylene gas). Officially-sanctioned color patterns are an integral part of this Aid.
References: Nearly all surveyed sources include this Aid. A sample of sources includes Tver 1987, Naish 1985, Bowditch 1966, Pearsall 1990

LIGHTBUOY. A term that is seemingly a very plausible candidate as a primary overarching term for Buoys with lights. However, few surveyed sources employ it. Nonetheless, Lightbuoy is the equivalent of the core term Lighted Buoy.
References: Pharos Marine, Sutton-Jones 1985

LIGHT-BUOY/LIGHT BUOY. An infrequently employed variant term for Buoys that are lighted. IHB 1956 (Brazil) and McEwen 1953 included the hyphenated version. IHB 1971 and Ansted 1985 use the non-hyphenated version.
References: IHB 1956, IHB 1971, McEwen 1953, Ansted 1985

ELECTRIC BUOY/ELECTRIC-BUOY. Older sources often include the type of energy used to generate the light in the name of the Buoy; rather often the term "light" was not included for these Buoys. The several sources employing these terms are elderly or refer to a historical situation.
Reference: Conway 1915, Gibbs 1955, Adamson 1953, McEwen 1953

ELECTRIC LIGHT BUOY/ELECTRICAL LIGHT-BUOY/ELECTRICALLY LIGHTED BUOY. The first term is an informal one possibly coined by Adamson and referring to the newer form of Lighted Buoy powered by electricity (a historical reference). Early forms were often referred to by the energy source rather the resulting form of the message. However, Adamson adds energy source to the word "light". Langmaid offers a variant form. Strobridge offers a second variant.
Reference: Adamson 1953, Langmaid 1966, Strobridge 1974

FLOATING LIGHT/FLOATING-LIGHT. The first term is an informal and perhaps colloquial term from Edward for a Lightship. The second version from Heap includes Light-ships and Lighted-buoys.
Reference: Edwards 1884, Heap 1889

FLOATING LIGHT BEACON. Langmaid offers this as a sub-overarching term for Floating Aids displaying a light whether Buoys or Lightships.
Reference: Langmaid 1966

FOSTER'S GAS-LIGHTED BUOY. Heap includes an illustration of this Aid in his 1884. It was one of several early forms or at least notions of a Lighted Buoy. No details are supplied.
Reference: Heap 1889

GAS BUOY/GAS-BUOY. Older Lighted Buoys were often designated by energy sources that provided the illumination. Many of these early forms are mentioned by only a few sources. However, the Gas Buoy is included by a substantial minority of the surveyed sources. These sources are often historic or the references are historical. Bowditch 1966, a newer source, also mentions it. McEwen hyphenates the term which is a common practice of McEwen for

numerous terms.
References: Putnam 1913, EB 1911, Weiss 1926, McEwen 1953

GAS LIGHTED BUOY/GAS-LIT BUOY. On occasion early sources give the energy source rather than the form of energy int titles as has been mentioned previously. Conway 1915 and Naish 1985 include these forms. Conway employs Gas Lighted Buoy as an umbrella term for Compressed Oil Gas and Compressed Acetylene forms. Curiously, Combination Buoys are included in Lighted Buoy categories for Conway even though a sound dimension alters the nature of the Aid.
References: Conway 1915, Naish 1985, Wheeler 1986

HIGH FOCAL PLANE BUOY/LIGHTED BUOY OF HIGH FOCAL PLANE. These terms refer to Buoys with a tall structure or tower mounted on the flotation tank; they are Lighted Buoys. Only a limited number of sources include this Buoy. LN gave this form official status and IALA mentions it. However, IALA 1976 and other sources omit it. Sutton-Jones 1985 includes the Buoy as an current Aid, and it may yet be in use. LN refers to it as a Light Buoy of High Focal Plane which may constitute a variant form or merely a semantic difference.
References: LN 1936, IALA 1970, Naish 1985, Sutton-Jones 1985

OIL-GAS LIGHTED BUOY. A single surveyed source refers to this form of Lighted Buoy. Oil-Gas was manufactured in the early 20th century primarily for Fixed Aids to Navigation though it was also used on a limited basis for Buoys. This is another example of adding the name of the energy source to the name of the Buoy.
Reference: Gibbs 1955

OIL GAS BUOY. A variation of the previous term. It is a Lighted Buoy though Lighted is omitted from the term.
Reference: Wesler 1966

LANTERN-BUOYS. A term employed only by Indonesia (IHB 1956). It may be a synonym for Lighted Buoy. Only limited data is available.
Reference: IHB 1956

FLOAT (LIGHT). A historic term employed in early 20th century Alaska. It displayed a light even though it was not mentioned in the title.
Reference: USLHS 1918

LUMINOUS BUOY. McEwen offers this as a variant form of the Lighted Buoy.
Reference: McEwen 1953

PLATFORM BUOY (LIGHT). A historic term only. It is of early 20th century and of British Columbia provence. The term is literally "Lantern on Platform."
Reference: USLHS 1918

SPAR FITTED WITH ELECTRIC LIGHT. An attempted description of an early Lighted Buoy rather than a formal name. The Buoy was employed for a time in New York habor and was connected to a electric plant on the shore via a cable.
Reference: Heap 1889

1B3 Can/Cone Forms:

CAN/CAN BUOY/CYLINDRICAL/CYLINDRICAL BUOY/CYLINDER BUOY/CAN-BUOY
Classification #: 1411
Form of Aid: Marine Floating Aid
Operation: The Can Buoy has the shape of a cylinder or nearly so. The color scheme substantially determines the meaning.
Comments: This Buoy form -- along with the Conical Buy -- is the most common form of Buoy. Can or Can Buoy is the most employed name though Cylindrical is sometimes used. In some instances Can refers to lateral use and Cylindrical to cardinal use. Can-buoy is an infrequently employed variant form. Johnson 1890 hyphenates this term (as so many other terms).
References: Can Buoy: Adamson 1955, Bowditch 1966, Bury 1978; Cylindrical: Ansted 1985, Bowen 1947; Cylindrical Buoy: Bowditch 1966, Sweden 1985, USNOO 1969; Cylinder Buoy: Bowen 1947; Can: Burton 1980, Kemp 1976; Can-Buoy: Johnson 1890

CANN BUOY. Historic spelling (and original spelling) in England for the Can Buoy.
Reference: Wheeler 1986

CONE & CAN BUOY. An unofficial, descriptive name for an Italian Buoy that consists of a cone above a can (or cylinder). Italy also employs the conventional Conical Buoy though not the Can or Cylindrical Buoys.
Reference: IHB 1971

CONICAL/CONICAL BUOY/CONE BUOY.
Classification #: 1410
Form of Aid: Marine Floating Aid
Operation: This Buoy has the form of a cone (point upwards). The meaning of the buoy is substantially determined by color scheme.
Comments: A curious situation is found with this Buoy and a second buoy, the Nun. The Nun is a truncated cone while the Conical is a true cone or nearly so. Yet either Buoy is the equivalent of the other. The color scheme is the same in both cases (that is, within Region A, Region B respectively). Seemingly only Bowen 1947 employs the variant name of Cone Buoy. See also Ogival entry and accompanying terminology conundrum.
Reference: Many sources include these Buoys especially those of an European provenence. Cone Buoy is included only by Bowen 1947.
References: Edwards 1884, IALA 1970, LN 1936, Naish 1985, Bowen 1947

CONVEX BUOY. Edwards includes a list of diverse buoys accompanied by remarks regarding problems of nomenclature. Seemingly no additional details are available for this Buoy.
Reference: Edwards 1884

NUN/NUN BUOY.
Classification #: 1311
Form of Aid: Marine Floating Aid
Operation: This Buoy usually has the form of a truncated cone though the truncation may be muted. The color schema is of vital importance in determing the meaning. See also: Conical/Conical Buoy which applies, in part, to this form.

This form is more commonplace in US sources.
References: Adamson 1953, USNOO 1969, Stevenson 1959, Bradford 1972

LIGHT, TALL TYPE, METAL CONE BUOY. A term from Strobridge. It refers to a Buoy type in the 1920s that replaced Wood Spar Buoys which were vulnerable to damage from ice and other problems.
Reference: Strobridge 1974

TALL CAN BUOY/TALL NUN BUOY/SPECIAL CAN BUOY/SPECIAL NUN BUOY. These are Buoys that continue to be mentioned in the literature (especially US Coast Guard) yet they were largely obsolescent (or probably obsolete) already in 1968 and are mostly historical. Conway 1915 illustrates the forms of Buoys of that era and the tall varieties are longer, more elongated and more substantial (below the water line level) than other forms. The only remaining forms of the tall Buoys are a few small buoys (6th class Can and 6th class Nun) which lack a radar reflector and are used on rivers. Special Buoys were relatively large Buoys though smaller than the tall forms. They may represent a now obsolete form. Strobridge offers a slightly variant form with tall type Can, Nun Buoys.
References: Conway 1915, USCG 1964, USCG 1979, Strobridge 1974.

SPINDLE-SHAPED NUN BUOY. A descriptive and non-official name for an early form of the Nun Buoy.
Reference: Naish 1985

IRON CAN BUOY. Older sources not infrequently included the metal of construction in the name of the Buoy as is the case here.
Reference: Gibbs 1955

IRON NUN BUOY. The previous comment regarding the Iron Can Buoy can be applied here as well.
Reference: UK 1861

FAST WATER BUOY. An overarching term for USCG Fast Water Buoys. See also following entry.

Reference: USCG 1990

FAST WATER NUN BUOY/FAST WATER CAN BUOY. These are USCG Unlighted Can and Nun Buoys designed for fast moving currents in rivers. The base of the buoy is a half-sphere filled with foam and topped by the appropriate cylindrical or conical unit.
Reference: USCG 1979

1B4 Spar Buoys

SPAR/SPAR BUOY/SPAR-BUOY
Classification #: 1412
Form of Aid: Marine Floating Aid
Operation: The Spar or Spar Buoy is a slender, relatively long wooden post or float of metal plates that rides in a nearly vertical position. The color scheme largely determines its meaning.
Comments: This is one of the oldest forms of Buoys and it continues to have a major status through IALA. It is no longer standard for USCG.
References: Most surveyed sources include the Spar. These include: Fifield 1980, Pharos Marine, Burton 1980, Tver 1987, Layton 1982, Johnson 1890.

SPAR ON CAN/SPAR ON CAN-CONICAL/SPAR ON CONE/SPAR ON CURVED CAN. These are special forms and may not constitute true Spars. They are in use in various European nations and often by nations employing extensive systems of Spar Buoys. The Spars are mounted on cans, cones, can/conical, or forms partially conical or partially curved. The names are descriptive labels rather than formal names. Norway reserves the name Spar to the true Spar form while the variant forms are termed Spars Buoys.
References: IHB 1956, IHB 1971

SPAR: SPINDLE-TAPERED SPAR. League of Nations 1936 subsumes the Spindle under the appellation of Spar and describes it as a Tapered Spar.
Reference: LN 1936

IRON SPAR/IRON SPAR BUOY. Older sources often included the material of

construction in the name. This practicemay have more importance since Spars have been both of wood and of iron or steel plates.
Reference: Conway 1915

WOODEN SPAR/WOODEN SPAR BUOY. Older sources often included the material of construction in the name. Older spars were only of wood and then only later of iron or steel.
References: Conway 1915, USCG 1964

TUBULAR SPAR BUOY. A perhaps informal term employed by Naish 1985. The Buoys in question are largely plastic forms in sheltered locations. It is not clear how Tubular Spars are at variance with other Spars. Possibly they are of a less elongated form.
Reference: Naish 1985

FLOATING BEACON. This term appears to be an overarching term: Beacons that float (though not all sources include Buoys as a form of Beacon). While the term can have a very general meaning it has a very specific meaning here: a Dutch term referring to specific Spar-like Aids. It may have been employed when Fixed Beacons were present with Buoys of a similar shape. The term is not used when only Buoys constitute the frame of reference.
References: IHB 1956, IHB 1971, Bradford 1972

1B5 Barrel & Cask Forms

General Comments: This group of perhaps eight forms can be regarded as a small and obscure group yet it is an ancient and numerous category. Many of the entities are of an indirect navigation character (and described in the Morphology category). Two terms are employed to define this group: Barrel and Cask. Barrel is possibly employed by more sources though not overwhelmingly so. *Webster's Second International Dictionary* views Cask as a generic term for Barrel, Tun, Kegs and other terms. Less than a quarter of the surveyed sources of the lst. ed included at least one of the terms of this group.

BARREL/BARREL BUOY. A core name for Buoys whose horizontal dimension

is greater than the vertical. The Barrel was an early form of Buoy (13th century) and the original Buoy containing air (as opposed to various solid Spars and related forms). Many of the sources mentioning this Buoy are of older vintage. However, some more recent sources also include it. Barrel often appears without the addition of Buoy. Wesler, however, employs the fuller form.
References: Conway 1915, Naish 1985, IALA 1970, IHB 1956, Corbin 1926 Wesler 1966

CASK. This term is a synonym, or at least an overlapping term, for/with the Barrel. It finds limited use in largely indirect navigation situations.
References: Kercove 1961, Pearsall 1990, Bradford 1972

DRUM BUOY. See remarks for Convex and Mast Buoys.
Reference: Edwards 1884

KEG BUOY. This term is included by USNOO 1969. It is a term of confusion: for USNOO it is a small cask or keg with flag also known as a Dan Buoy. Dan Buoy, in turn, is both a physical entity and a morphological one. Keg physically means a Cask but the USNOO definition moves it closer to the morphological than to the physical.
Reference: USNOO 1969, Wheeler 1986

OIL DRUM/OIL-DRUM BUOY. USCG mentions the Oil Drum in some publictions as an Aid to Navigation; it constitutes a form of Barrel. Some forms of the USCG Oil Drum were of a single drum form while others were double.
Reference: USCG 1974

TONNE/TON BUOY/TUN/SEATONNE. These terms are identical or nearly so in meaning. Tun comes from the Anglo-Saxon tunne meaning tun or tub. A Tun is a large Cask and employed under that name by Sweden. IHB 1956 uses the alternate of Ton Buoy and Naish employs Tonne or Seatonne; the latter is the German form of Barrel Buoy.
Reference: Swedish Adm. 1985, Naish 1985, IHB 1956

General Comments. "Unitary nature" refers to Buoys which have a single form and that lack any variant forms. By contrast, some forms including Spar and Barrel Buoys have numerous forms. It is possible that a unitary Buoy form may have subtle and nuanced multiple forms yet a clear and single image dominates.

OGIVAL BUOY. This Buoy had official standing in LN USB for Cardinal usage though few nations employed it. The Buoy appears in LN 1930 and LN 1936 at least for international agreements. But the term seemingly failed to survive the supplanting of LN by IALA. Ogival comes from the French word Ogive which, in turn, refers to the Ogive arch in Gothic architecture. The Maritime Information Centre at Greenwich, London suggests that the Buoy has survived but under the name of Conical Buoy. Seemingly the problem was the name of Ogival not the shape. If true the actual Conical has largely fallen out of use and the Ogival has replaced it even if not under the name Ogival. This may not be a definitive answer to the term.
Reference: IALA 1980, Stevenson 1959, McCormick 1936

PILLAR BUOY.
General Comments. A term of some confusion. It is missing from IALA 1970. It is apparently illustrated in LN though not listed. It may possibly be a unitary term: a Buoy with a substantial superstructure on a broad tank base or it can -- and more likely -- be an encompassing term for several forms of Buoys including the High Focal Plane Buoy. IHB 1956 and IHB 1971 pictures it but does not name it. It includes the Beacon Buoy or it can be a synonym for the Beacon Buoy (and Beacon Buoy has a different meaning in Germany). It is both listed and pictured in IALA 1980. Possibly the Lighted Buoys of the US and of other nations are excluded from the Pillar Buoy since they lack the broad base of the Pillar Buoy; however, USCG 1990 includes all Buoys with a substantial superstructure under the Pillar heading.

SPHERICAL BUOY/SPHERE BUOY.
Classification #: 1201
Form of Transportation-Marking: Marine: Buoy
Operation: The Spherical Buoy presents a visual image of a sphere coupled with appropriate colors and patterns. It has a major role in IALA for Safe Water Marks.

Bowen in 1947 employs Sphere Buoy; seemingly no other source does so.
References: IALA 1980, Stevenson 1959, McCormick 1936

SPINDLE BUOY. This Aid, in a fixed form, was a relatively common entity among older Daybeacons especially in the US. But the Spindle Buoy receives little mention. Perhaps no more more than ten per-cent of the surveyed sources in the lst ed included it, and it has been omitted from the 1980 IALA Buoyage system. It was an alternate form for the Cardinal System within LN 1936 though few nations employed it. In fact. LN classified it as a form of Spar of a tapered shape and it is therefore also placed in that category. Only the Ogival Buoy has received less notice among what may be regarded as major forms.
References: LN 1936, IALA 1970, Naish 1985, Bowditch 1966

Classification #: 1203
Form of Aid: Maritime Floating Aid
Operation: A Buoy with a highly visible daymark in the form of a significant superstructure. Lighted forms can exist for this form. Colors and patterns contribute much of the message.
References: Burton 1980, IALA 1976, Naish 1985, Tver 1987, USCG 1990, Fifield 1980

CAGEWORK BUOY. A rare term and seemingly employed only by Pearsall 1990. Pearsall lists it as a major form. Possibly he is referring to the Pillar Buoy. USCG refers to the Pillar as being of cage or tower types and Pearsall's Cagework may reflect the superstructure of the Buoy.
References: Pearsall 1990, USCG 1990

1B7 Sound Buoys Forms:

SOUND BUOYS.
Comments: Sound Buoys can constitute an overarching term for Buoys with a sound dimension though few sources employ it. The terms for a specific type of sound-equipped Buoy (Bell, Whistle, Gong, Horn) are usually preferred to this general Term.
Reference: Adamson 1955, Tver 1987, USCG 1959, USCG 1977

AUTOMATIC SOUNDING BUOY. Term employed by UK Trinity House/Board of Trade Uniform System of Buoyage in 1882-1883. An archaic term and a very early reference to Sound Buoys; perhaps the earliest in a Buoyage system.
Reference: UK Board of Trade 1883

SOUND SIGNAL BUOY. This term from Kettle seems to have an overarching meaning. In 1896 that would mean either a bell or a whistle buoy.
Reference: Kettle 1896

SOUNDING BUOY. This is seemingly an overarching term for Buoys with Fog Signal apparatus. There were two forms for Edwards: bells and whistles.
Reference: Edwards 1884

BELL BUOY/BELL-BUOY/BELLBUOY.
General Comments. It seems possible that Bell Buoy can encompass both Bell Buoys without lights (Unlighted Bell Buoy) and Bell Buoys with lights. Tver 1987 seems to confirm this since the definition refers to Bell Buoy while illustrations refer to Unlighted and Lighted Bell Buoys. Bell Buoy then is a Buoy emitting a Bell sound and it may/may not contain other messages. Renton gives the term as one word.

Classification #: 1500
Form of Aid: Marine Floating Aid
Operation: The Bell Buoy is wave-actuated in operation: a bell hung from the superstructure is activated by several tappers hung from the same structure.
Comments: Listed in Fog Signal chapter of the Database as well.
References: IALA 1970, Tver 1987, Ansted 1985, Johnson 1890, Renton 2001

UNLIGHTED BELL BUOY. While this is a more specific term than Bell Buoy it is infrequently employed. Nearly two-thirds of surveyed sources speak simply of Bell Buoy (which does not necessarily exclude a lighted dimension). Less than a tenth of surveyed sources in the lst ed include Unlighted Bell Buoy.
References: USCG 1959, Gibbs 1955, Tver 1987

BELL BOAT/BELL-BOAT/BELL SHIP. A historic Aid only. Few sources refer to this term. The Aid consisted of a small boat with a bell mounted on the deck; there was no crew. The Bell Boat began in the 19th century and apparently ended its service in a quarter-century or less. Smith 1971 includes an apparent variant form with Bell Ship.
References: Weiss 1926, Adamson 1953, Smith 1971

BROWN'S BELL BUOY/BROWN BELL BUOY. Historic term for an early form of Bell Buoy. In this form the bell is mounted in the bottom of the Buoy and a carefully positioned cannon ball slams against the bell when activated by the motion of the sea. A curious entity but seemingly a relatively common one in the later 19th century. Variant form of term is from Wesler.
References: Wheeler 1986, Johnson 1890, Wesler 1966

CARILLON BUOY. This Buoy is found only in France. It consists of a group of bells rather than a single bell which is a far more common Aid. The group of bells is sounded by multiple sea-activated tapers.
References: IALA 1970, French STPB

GONG BUOY
Classification #: 14.15.152
Form of Aid: Marine Floating Aid
Operation: A wave-actuated Aid. A set of Gongs situated within the super-structure of the Buoy are struck by several tappers activated by the movement of the Buoy.
Comments: This is a less common form of Sound Buoy; no more than a quarter of the surveyed sources included it.
References: Kerchove 1961, Hill 1958, IALA 1970

IRON BELL BEACON VESSEL. Term found only in UK and supplied by Denmark. The term may refer to an archaic Aid or it may refer to a recognizable current form under an archaic title.
Reference: UK 1861

WHISTLE BUOY.

General Comments: It would seem that the term Whistle Buoy can encompass both unlighted (Unlighted Whistle Buoy) and lighted forms (Lighted Whistle Buoys). Tver 1987 seems to confirm this since the definition refers to Whistle Buoy while the illustrations refer to Unlighted and Lighted Whistle Buoys. Whistle Buoy then is a Buoy with a whistle mechanism and may/may not contain other message dimensions.
Classification #: 1501
Form of Aid: Marine Floating Aid
Operation: A wave-actuated mechanism in which air pushed up a tube by the movement of waves escapes through an aperture and activates a whistle occupying the upper part of the tube.
References: Adamson 1955, Weems 1940, Pearsall 1990, Layton 1982

WHISTLING BUOY/WHISTLING-BUOY. Some older sources refer to a Whistling Buoy instead of a Whistle Buoy. McEwen 1953, much given to hyphens, offers a variant form of the term. Older sources may have focussed more on the action than on the physical form. See also Courtenay Whistling Buoy and Large Whistling Buoy.
Reference: Conway 1915, USLHS 1918, Putnam 1913

UNLIGHTED WHISTLE BUOY. This term is similar to Unlighted Bell Buoy since it is more specific than simply bell or Whistle Buoy yet rarely employed. References to the Whistle Buoy do not necessarily exclude a lighted dimension. More than two-thirds of sources surveyed include the Whistle (or more rarely, Whistling Buoy) while few include the Unlighted Whistle Buoy.
References: Tver 1987, USCG 1959

COURTENAY'S WHISTLING BUOY/COURTENAY BUOY/COURTENAY WHISTING BUOY. Courtenay invented an early, if not the earliest, version of this Aid. Few sources include mention of this Aid in this form. Edwards supplies the second form.
References: EB 1911, Wheeler 1896, Edwards 1884

AUTOMATIC SIGNAL BUOY/AUTOMATIC BUOY. These terms from Kettle refer to Courtenay's Whistling Buoy. The Automatic Buoy is also found in

Johnson 1890 but without a clear indication of meaning. For that reason Automatic Buoy is also listed in overarching terms.
Reference: Kettle 1896

LARGE WHISTLING BUOY. Seemingly a single source employs this term. Newer sources may refer to classes (sizes) of Buoys but only this term incorporates a word indicating the size of the Aid.
Reference: Conway 1915

ALARM BUOY. A rare term employed only by McEwen. Does it constitute a specific form of sound? Or is it a general term for all forms of Sound Buoys?
Reference: McEwen 1953

SIREN BUOY. A term apparently employed only by Pearsall. It is not clear whether this is a specific form of sound or a general overarching term since there are no other references to a Buoy with Sirens.
Reference: Pearsall 1990

HORN BUOY. The few references seem to indicate this Buoys has a lighted form only. Yet Tver 1987 includes a form that omits mention of a light. However that reference focusses on Sound Buoys and not on Lighted Buoys; this omission may have only limited meaning. The Buoy presumably contains a Diaphragm Horn, Oscillator form.
Reference: Tver 1987

TRUMPET BUOY. This term refers to a Buoy with what is presumably an Electric Diaphragm Horn. Unlike sea-activated Sound Buoys this Aid has a characteristic with an assigned character.
Reference: USNOO 1969

1B8 Combination Buoys

General Comments: Buoys in this group combine the message producing abilities of two distinct forms. These are generally combinations of light and sound energy forms.

BOAT-SHAPED BUOY. An older form of Buoy employed in UK with light and bell.
Reference: EB 1911

COMBINATION BUOY. This a Buoy that includes at least two forms of messages. Usually these are lighted and sound forms though electronic forms may be present. The unlighted-visual dimension is always present in a buoy and not a factor in labelling a buoy as a combination buoy.
References: Bowditch 1966, USNOO 1969

LIGHTED SOUND BUOY/LIGHTED-SOUND BUOY. This is the overarching term for Buoys having both light and sound dimensions. Few sources employ the term; most sources instead opt for specific terms and even employ the basic sound terms whether or not a lighted dimension is present. Adamson 1955 offers both a hyphenated version as well as an unhyphenated form.
References: USNOO 1969, Adamson 1955

LIGHTED BELL BUOY/LIGHTED BELL BUOY (CAN/CONICAL/ SPHERICAL)/LIGHTED & BELL BUOY.
Comments: This Aid consists of both light and sound mechanisms and is thereby classified as a Combination Buoy. Only a limited number of sources include this Buoy; however, references to Bell Buoys may not exclude a lighted portion. LN and IALA add shape-related day marks which thereby causes a Buoy to become classified as a Conical, Spherical or Cylindrical Buoy. US and several other nations maintain Light, Sound, Combination Buoys without reference to shape. The final form, from Strobridge 1974, is mentioned only in that source and, in turn, its source, the US Lighthouse Service.
References: Floherty 1942, USCG 1964, Adamson 1955, Strobridge 1974

GAS & BELL BUOY/COMBINATION GAS & BELL BUOY. These terms reflect an older practice in which energy sources became part of the name; in fact, energy source instead of the word light are included in the name (for example, Gas Buoy not Lighted Buoy). These Aids are from the early 20th century.
References: Conway 1915, USLHS 1918

LIGHTED WHISTLE BUOY. This Aid consists of two forms of mechanism using different energy sources and is thereby classified as a Combination Buoy. Light and sound mechanisms are very similar, if not identical, to Buoys which are lighted or which have a whistle.
References: Bowditch 1966, Adamson 1953

GAS-WHISTLE BUOY/GAS-WHISTLE BUOY/GAS & WHISTLE BUOY. These terms reflect an older practice of including the energy source in the name of the Buoy. These Buoys display a light as well as a wave-actuated whistle.
References: Conway 1915, USLHS 1918, Adamson 1955, Langton 1944

LIGHTED GONG BUOY. This Aid is comprised of a Gong Buoy accompanied by a light and included by only a few sources. However, some sources that mention the Gong Buoy do not necessarily exclude the lighted dimension of the Buoy.
References: Adamson 1955, Floherty 1942, USCG 1957

LIGHTED HORN BUOY. This Aid consists of a Diaphragm Horn, Oscillator type accompanied by a light mechanism. Only limited references to it are found in the surveyed literature.
Reference: USCG 1991

SUBMARINE BELL BUOY/BUOY FITTED WITH A SUBMARINE BELL. A historic Aid employing a Buoy and a Submarine Bell. The Buoy may also have a light and surface Sound Signal. Submarine Bells were often attached to Light-ships but some were also attached to Buoys. Submarine Bells attached to Buoys were activated by action of the sea and therefore did not have a programmed message code as was the case with the Lightship forms.
Reference: Putnam 1913, USLHS 1918

GAS, WHISTLING, & SUBMARINE BELL BUOY. A historical Aid listed by a few early 20th century sources. It combines a light, whistle and underwater bell. The Fog Signal portion of the Database discusses Submarine Bells.
References: Conway 1915, USLHS 1918

1B9 Other Buoy Physical Forms

a) Materials of Constructions Subforms

FOAMED BUOY/FOAM-FILLED BUOY/GLASS-FIBRE BUOY/ REINFORCED PLASTIC BUOY/GRP BUOY/IRON BUOY/METAL BUOY/PLASTIC BUOY/WOOD(EN) BUOY/OAKEN BUOY/STEEL BUOY. A few sources, often older though occasionally newer, add the material of construction to the name of the Buoy. Frequently only the material of consturction is included without mention of shape or morphology. GRP [Glass Reinforced Plastic] refers to what is termed fiberglass in the US.
References: Pharos Marine, Langmaid 1966, Johnson 1890, Gibbs 1955, Naish 1984, UK 1861, Kettle 1861, Monroe & Stewart 2005, Roylan, USCG 1990

b) Special Names Referring to Physical Structure [Not Morphology] Subforms

BLIND BUOY. McCormick 1936 states that this term refers to a Buoy that lacks a light.
Reference: McCormick 1936

DAN BUOY. A somewhat confused term: the Dan Buoy is a Keg Buoy with flag but its physical character causes it to be a physical entity while its morphological character places it in that category as well. See also: Keg Buoy in Barrel & Cask Group and Dan Buoy (Morphology)
Reference: Kerchove 1961, USNOO 1969, Ansted 1985

DISCREPANCY BUOY. A USCG Buoy that can be transported easily and which is employed as a temporary replacement for a regular Buoy that is impaired.
Reference: USCG LL-PC 1991

DOUBLE BUOY/RELIEVING BUOY. These terms are included only by Adamson 1953. The Buoy in question was situated below the waterline and assisted the accompanying surface Buoy by reducing the stress and strain on the heavy mooring chains in deep water. This is seemingly an older practice and per-

haps historic only.
Reference Adamson 1955

ICE BUOY/ICE-BUOY. A very strongly constructed Buoy that can withstand the pressure of ice. Metal Spar Buoys have been employed for this purpose. Special forms of Lighted Buoys have been designed for ice conditions.
References: USNOO 1969, Sutton-Jones 1985

WINTER BUOY. Included by only a few sources. It is a replacement Aid during times when regular Sound and/or Lighted Aids are unable to operate reliably.
References: IALA 1970, Swedish Adm. 1985, USNOO 1969

c) Other Subforms

BEACON BUOY/BEACON-BUOY/BEACON BUOY II/BAKE BUOY. There are at least two different Buoys that bear this name. For USNOO 1969 it is a synonym for the Pillar Buoy. McEwen 1953 includes mention of a Beacon Buoy with the inevitable hyphen; but the meaning is not clear. Beacon Buoy II is the English language translations of the German Bake Buoy. The Bake Buoy has a lateral and a cardinal form as well as both unlighted and lighted forms. It has a nearly ubiquitous role in German navigation.
References: McEwen 1953, USNOO 1969, IHB 1956, IHB 1971

PERCH BUOYS/SUMMER PERCH BUOY/WINTER PERCH BUOY/LOG PERCH BUOY. Denmark in IHB 1956 and UK 1861 focusses attention on a Buoy known as a Perch Buoy. The Buoy bears a resemblance to what other nations consider a Spar. Yet Denmark, which has Spar Buoys, considers some forms under the name of Perch. Perch is a major overarching term in Daybeacons yet largely unknown in Buoyage. Perch derives from OF with the meaning of Pole. A case can be made for subsuming the Perch under Spar.
References: IHB 1956, UK 1861

--Radio Aids Buoys Forms

RADAR BEACON BUOY/RADAR REFLECTOR BUOY/RADIOBEACON BUOY/RADIO BEACON BUOY/SONOBUOY/ SONO-RADIO BUOY. These four Buoys (with alternate spelling for one) contain and manifest Radio Aid properties thereby combining a Radio Aid with a Buoy and its colors and patterns. See Radio Aids chapter of this study.
References: USNOO 1969, Floherty 1942, Bowditch 1966, Wesler 1966

---Historic Buoy Forms:

Comments. UK 1861, Naish 1985, Wryde 1913, among other sources, includes historic forms that are altogether historic in nature or whose form or name are substantially changed. UK 1861 is especially notable for names based on shape or a person's name but lacking other data.

--Buoy Shapes Subforms:

EGG-BOTTOMED/FLAT-BOTTOMED/BOTTLE-SHAPED/FLAT-BOTTOM , WROUGHT IRON. UK 1861 supplies only limited information for these Buoys.
Reference: UK 1861

--Personal Names For Buoy Name Subforms:

CAPTAIN HARRIS'S FLOATING LIGHTHOUSE /CAPTAIN MOODY'S FLOATING LIGHTHOUSE. These terms are from Heap.
NOTE: Lenox uncertain: Check source.
Reference: Heap 1889

HERBERT'S BUOY/IRON (HERBERT'S) BUOY/HERBERT OR INVERTED CONE BUOY/LENOX'S BUOY/POULTER'S BUOY/PEACOCK'S LIFE BUOY. These terms are also courtesy of UK 1861. See Also: Refuge Buoy-Beacon.
Reference: UK 1861

--Other Historic Forms:

HOLLOW-BOTTOM BUOY. A historic term from Naish 1985. It refers to an early patented form of the modern Buoy of iron and containing --or consisting of -- a flotation tank.
Reference: Naish 1985

REFUGE BUOY-BEACON. A historic term and curiosity. It was invented by a Captain Peacock and intended to offer refuge to shipwrecked mariners. It contained a bell intended to be human-activated.
Reference: Wryde 1913

1C Buoy Morphological Forms

1C1 Location Forms

General Comments. A variety of sources attach non-physical qualities to Buoys and these often become the names of the Buoys in question. The physical properties are present but the name has more of the morphological in it. The first of these morphological terms are locational in character. Several sources have classified or described Buoys according to the location. Location names are divided into three parts: Approach Buoys, Channel Edges or Limits Buoys, and In-Channel Buoys.

a) Approach Buoys

APPROACH BUOYS. Hill's *Dutton's Piloting* uses this term, apparently, as a synonym for Landfall Buoy. No other surveyed source included it.
Reference: Hill 1958

BAR BUOY. A nearly self-explanatory term. This Buoy denotes presence of a bar at a river or harbor mouth. Only Kerchove 1961 among the surveyed sources includes the term.
Reference: Kerchove 1961

FAREWELL BUOY. A single surveyed source includes this Buoy. The term is an alternate for Sea Buoy.
Reference: USNOO 1969

LANDFALL APPROACH BUOY. This is employed only by Naish 1985 who incorporates the word Approach into the title of the Landfall Buoy. It is seemingly interchangeable with Landfall Buoy. Other sources speak of approaching the sea (or land) by a Buoy termed a Landfall Buoy.
Reference: Naish 1985

LANDFALL BUOY/LAND FALL BUOY. This is the first buoy to be observed when approaching a harbor from the sea; some sources describe it as the last Buoy

when leaving a channel and moving out to the sea. See also Farewell Buoy and Sea Buoy.
Reference: IALA 1970, Bowditch 1966, USNOO 1981

RECOGNITION BUOY. An alternate to the Landfall Buoy term employed by Naish.
Reference: Naish 1985

SEA BUOY/SEA-BUOY. This is the first (or last) Buoy in a channel where it meets the sea. Farewell Buoy is an alternate name. IALA 1970 uses the hyphenated form and notes it is the US term for the Landfall Buoy. See also Farewell Buoy.
Reference: Tver 1987, Hill 1958, USNOO 1969

b) Channel Edge Forms

PORT BUOY/PORTHAND BUOY/PORT-HAND BUOY/PORT-SIDE BUOY/ PORT HAND BUOY. The titles of these Buoys incorporate the name of the location. Messages and physical dimensions can be extrapolated from the locational names.
References: IALA 1970, Kerchove 1961, USNOO 1981

STARBOARD BUOY/STARBOARD HAND BUOY/STARBOARD-HAND BUOY/STARBOARD-SIDE BUOY/RIGHTHAND BUOY. The various starboard terms are similar though nuanced differences are present. The issue of which side a Buoy of a given color and shape is to be found presents a crucial issue in navigation. The most workable arrangement is that of Regions A and B of IALA. Red Buoys are to starboard in Region B while Green Buoys are to starboard in Region A.
References: IALA 1970, Kerchove 1961, Naish 1985, USNOO 1981, Burton 1980

c) Channel Limits Forms

BIFURCATION BUOY. This Buoy marks the point of divergence of two

channels which is the opposite of a junction wherein channels become one. Term and concept dropped from IALA Buoyage System though 1980 revisions of the system appear to contain a procedure akin to the Bifurcation Buoy though not under that name. The US formerly subsumed junction and bifurcation functions under Junction Buoys. See Also Junction Buoys and Preferred Channel Buoy.
References: Kerchove 1961, IALA 1970, Bury 1978

CENTERLINE BUOY. Only one source refers to this Buoy. The term is virtually self-explanatory: a Buoy denoting the center point in a channel; a common role yet a rare if not obscure term.
Reference: USNOO 1981.

CHANNEL BUOY/CHANNEL-BUOY. This Buoy delimits channel limits (configured according to the direction of navigation from seaward to head of navigation). Limited sources include the term.
References: Kerchove 1961, Naish 1985, McCormick 1936, McEwen (with hyphen)

FAIRWAY BUOY. Buoys under this name mark the navigable area in a body of water. Channel Buoy may be similar in meaning to this term.
References: Sutton-Jones 1985, USNOO 1969

JUNCTION BUOY/LIGHTED JUNCTION BUOY. This Buoy marks the point of merging of two channels. The reverse is a Bifurcation Buoy. Both have been eliminated in the IALA system. However, changes in IALA Buoyage System in 1980 created Preferred Channel Buoys. One source, USCG 1959, refers to a Lighted Junction Buoy though frequently such Buoys will be referred to as Junction Buoys without specific mention of the presence or absence of a lighted dimension.
References: IALA 1970, IALA 1976, IALA 1980, Weems 1940, USCG 1959

LATERAL BUOYS. A perhaps curious term since few explicit references are made to Lateral Buoys even though they are quite common; references are usually to the Lateral System. Weems is the single surveyed source referring to this specific Buoy.

Reference: Weems 1940

MID CHANNEL BUOY/MID-CHANNEL BUOY. A Buoy of official standing before IALA. It denoted deep water channels or fairways; also termed a Fairway Buoy. The Safe Water Buoy of IALA is seemingly the equivalent of it.
References: IALA 1970, IALA 1980, Kerchove 1961, USNOO 1969

MIDDLE GROUND BUOY/MIDDLE-GROUND BUOY/MIDDLEGROUND BUOY. These terms refer to Buoys that mark the end of a middle ground (shoaling area between channels). These Buoys may no longer be in use since IALA has eliminated them. Weems, among surveyed sources, considers Middleground to be one word.
References: IALA 1970, IALA 1980, Kerchove 1961, USNOO 1969, Weems 1940

"PREFERRED CHANNEL BUOY". There may not be a Buoy by this name. The older IALA system (or earlier phase of the one IALA system; System A [Europe] 1976) contained Port and Starboard Buoys but no Bifurcation/Junction/ Middle-Ground Buoys. However, at Tokyo 1980 a "Preferred Channel" marking was added to the system (along with Cardinal Markings for Region B) and the Preferred Channel markings are very similar to the older and now defunct markings. Hence the coining of this phrase to be included in the Database.
References: IALA 1980, IALA 1976

TRANSITION BUOY. A Buoy that denotes transition from Cardinal to Lateral systems or the reverse. It is seemingly a pre-IALA marking and is not found in the 1980 IALA system.
References: IALA 1970, IALA 1980, LN 1936

TURNING BUOY. A Buoy denoting a turn in a channel or other location. It is not entirely clear what the message particulars are.
Reference: USNOO 1969

1C2 Message Forms

BLACK BUOY/GREEN BUOY/RED BUOY/WHITE BUOY/YELLOW BUOY. The names for Aids are from message indications. The physical dimension and locational factors are present but subsumed into the message which becomes the Buoy name. The naming of a Buoy by color denotes far more than merely color; shape and location are indicated by the color as well.
References: Bowditch 1966, Burton 1980, Hill 1958, Bradford 1972

BLACK/WHITE VERTICAL STRIPED BUOY/CHECKERED BUOY/ CHEQUERED BUOY/PARTI- COLORED BUOY/RED & BLACK HORIZONTAL BANDED BUOY/RED, RIGHT RETURNING BUOY/VARI-COLORED BUOY/WHITE & BLACK HORIZONTAL BANDED BUOY/WHITE & INTERNATIONAL ORANGE BUOY/YELLOW & BLACK VERTICALLY STRIPED BUOY/YELLOW (GREEN TOP) BUOY (OR WHITE BUOY WITH GREEN TOP).
Comments: Vari-colored Buoys may be less a name than a descriptive term with the meaning of Buoys of various colors; it is included by Adamson. Red, Right Returning Buoy is an expression of navigation practice though it takes on the name of a Buoy for Tver. Phillips adds shape to color Buoys (Black Conical, Red Can-Shaped Buoy, Red/White Cone-Shaped Buoys).
References: Bowditch 1966, Hill 1958, Adamson 1953, Tver 1987, Gibbs 1955, De Kerchove 1961, Phillips 1949, USNOO 1969, UK 1883

INTRACOASTAL WATERWAY BUOY. Tver refers to Buoys associated with that waterway under the waterway's name; it becomes a generic heading. Only this surveyed source employs that designation; most sources that refer to the Intracoastal Waterway do not attach its name to the Buoys.
Reference: Tver 1987

TOPMARK BUOY. Topmarks are often found with Buoys (though less often in the US) but seemingly only USNOO refers to a Topmark Buoy. This obviously means a Buoy displaying a Topmark.
Reference: USNOO 1969

1C3 Hazard Buoys

CABLE BUOY/CABLE-BUOY/TELEGRAPH BUOY/TELEGRAPH CABLE BUOY/SUBMARINE TELEGRAPH BUOY. Buoys marking the location of submarine cables include both differentiated and undifferentiated forms and accompanying names.
References: Kerchove 1961, USNOO 1969, Langmaid 1966, McEwen 1953

DAN BUOY. This term has both physical and morphological meanings. Morphological meanings include Fish Net Marking Buoys. See Also: Keg Buoys in Physical Forms.
Reference: IALA 1970, IALA 1976, USNOO 1969, LN 1936

DANGER BUOY/ISOLATED DANGER BUOY. Both terms refer to an isolated danger situation. The Isolated Danger Buoy was in use before IALA but the term and Buoy greatly increased in importance with IALA and now encompasses Wreck Buoys. Isolated Danger Buoys were included in LN 1936 but they were of a restricted nature. See Also: Obstruction Buoy.
References: IALA 1970, IALA 1976, USNOO 1969, LN 1936

DREDGING BUOY. This Buoy is for surveying operations and dredging. It displays a white body and green top. It is a pre-IALA Aid.
References: USCG 1959, USCG 1962

FISHNET BUOY/FISH NET BUOY/FISH-NET BUOY/FISH TRAP BUOY. Term refers to a Buoy that marks the area of a fish net. Sweden employs a variant form which possibly addresses a different situation. Tver 1987 has "fishnet" as one word. This group of terms and Buoys can be seen as Special Purpose Buoys and also as Hazard Buoys.
References: Tver 1987, USNOO 1959, McEwen 1953

OBSTRUCTION BUOY. IALA sees this term as the US equivalent of the Isolated Danger Buoy (which is labeled as UK usage though in the IALA system of 1980). The term, included by only a few sources, may be a synonym for the Danger Buoy yet it possibly suggests a nuanced difference: Danger Buoy explicitly denotes a danger while the Obstruction Buoy refers to obstructions with an implicit indication of possible or potential danger.

References: Weems 1940, USNOO 1969, IALA 1970, IALA 1980

OUTFALL BUOY. This Buoy marks a drain or sewer pipe opening outfall. LN 1936 speaks of a combined Outfall and Spoil Ground Buoy.
References: Bowditch 1966, IALA 1970, USNOO 1981

PRACTICE AREA BUOY/MARKING OF AREAS-MILITARY/MILITARY PRACTICE AREA BUOY. These are Buoys denoting areas of military operations; the various terms may be identical or at least they overlap.
References: Bowditch 1966, LN 1936, Swedish Adm. 1985

SPOIL GROUND BUOY. Term refers to a Buoy denoting ground used for deposits of waste matter. See Also: Outfall Buoy.
References: IALA 1970, USNOO 1969

WRECK BUOY/WRECK-MARKING BUOY. A commonly employed Buoy especially in LN 1936 and other European systems. An elaborate system, both Lateral and Cardinal, was created to mark wrecks. US employ undifferentiated Special Purpose Buoys for such needs. IALA has dropped the Wreck Buoy. The Isolated Danger Buoy now includes the marking of wrecks.
References: IALA 1970, LN 1936, Naish 1985, McEwen 1953

1C4 Indirect Navigation Buoy Forms

a) Station Buoys.
General Comments: This is a small group of Buoys with numerous terms and a measure of confusion as well. The basic term is Station Buoy. Other terms include Watch Buoys, Watch-Buoys, Marker Buoys, Light Station Buoys and Light-Vessel Buoy.

LIGHTSHIP STATION BUOY/LIGHT-VESSEL STATION BUOY. A more specific version of the basic term of Station Buoys is represented by these Buoys. They are now largely historic terms now.
References: Tver 1987, USLHS 1918

MARKER BUOY. A term of many meanings. This specific use refers to the Station Buoy function. Few sources so employ the term; USNOO 1969 may possibly be the only source.
Reference: USNOO 1969

POSITION BUOY/POSITION SPAR. These terms are additional names for the Station Buoy. Only a few sources include these terms.
Reference: USNOO 1969, Kerchove 1961

STATION BUOY. This Buoy is an indirect Aid since it is installed near a Light-ship or major Buoy to mark those Aids if they should be moved off station by storm, removed for repairs, or other reasons. Other names for this Buoy include Watch Buoy, and Marker Buoy. These Buoys are often Can or Nun Buoys.
Reference: Tver 1987, USNOO 1969

WATCH BUOY/WATCH-BUOY. An alternate name for the Station Buoy. McEwen, of course, adds a hyphen to the name.
References: McEwen 1953, Kerchove 1961, Kemp 1976, Wryde 1913

b) Towing Buoys

FOG BUOY/FOG-BUOY/FOG SPAR. Alternate names for Towing Buoy.
References: Bradford 1972, USNOO 1969, McEwen 1953

TOWING BUOY/TOWING-BUOY/TOWING SPAR/TOWING-SPAR. This Buoy is very much indirect in nature. It refers to a mobile Buoy attached to the stern of a vessel to denote correct following distance especially in restricted visibility. It is especially applicable to naval vessels. It is included in the Database since virtually any Buoy has at least a peripheral and tangential relationship to Aids to Navigation.
References: USNOO 1969, Kerchove 1961, McEwen 1953

c) Anchor, Anchorage & Mooring Buoys

ANCHOR BUOY/ANCHOR-BUOY. Terms for a Buoy marking location of an

anchor sitting on the sea bottom. In some instances the Buoy is painted to indicate whether it is marking a starboard or port anchor. Buoy and anchor are usually fastened together.
References: Swedish Adm. 1985, IALA 1970, Conway 1915

ANCHORAGE BUOY/AERO ANCHORAGE BUOY/EXPLOSIVE ANCHORAGE BUOY. Terms for Buoys delimiting an anchorage (a place where vessels can anchor). Sweden includes two specialized forms: Aero and Explosive. Buoys for quarantine anchorage are termed Quarantine Buoys without mention of Anchorage according to USNOO 1969.
Reference: Swedish Adm. 1985, IALA 1970, Conway 1915

HONG KONG MOORING BUOY. A Mooring Buoy whose fastening element serves as a toggle for attaching a ship cable's to the Buoy.
Reference: McEwen 1953

KEDGE-BUOY. A Buoy to which lines are attached for use in mooring vessels.
Reference: McEwen 1953

LIGHT-VESSEL MOORING BUOY. A Mooring Buoy for a Light-Vessel in UK usage. The Buoy is can-shaped.
Reference: Langmaid 1966

MOORING BUOY. A Buoy offering permanent mooring for ships not at a dock. Also termed an Anchorage Buoy.
Reference: Kerchove 1961

QUARANTINE BUOY/QUARANTINE-GROUND BUOY/QUARANTINE (GROUND) BUOY. A Buoy denoting location of anchorage for quarantine or delimiting its area. Other anchorages are under the heading of anchorage but this form is under the specific purpose and lacks the more encompassing term of anchorage.
References: IALA 1976, Weems 1940, IALA 1970, Adamson 1953

TRUNK/TRUNK MOORING BUOY. This Mooring Buoy seemingly follows the

principle of fastening of the Hong Kong Mooring Buoy.
Reference: Kerchove 1961

WARPING BUOY. Another name for Kedge Buoy.
References: Kerchove 1961, USNOO 1969

1C5 Special Purpose Buoys

SPECIAL BUOY/SPECIAL PURPOSE BUOY/SPECIAL-PURPOSE BUOY/ SPECIAL DUTY BUOY. Older Special Purpose Buoys, in US parlance, had specific forms and color patterns for a variety of functions. LN 1936 referred to miscellaneous functions with similar results. US also maintained a general purpose Special Purpose Buoy while IALA includes a Special Buoy in solid yellow that encompasses a variety of special needs. Many of the older Indirect Navigation Buoys with specific names are now within the Special Buoy category. Langmaid refers to a Special-Duty Buoy which is seemingly a variant form.
References: LN 1936, USCG 1962, IALA 1980, USCG 1991, Langmaid 1966

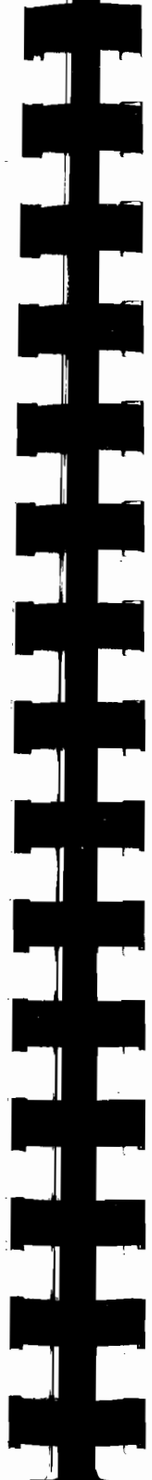
1C6 Miscellaneous Forms

COMPASS ADJUSTMENT BUOY. A Buoy so positioned as to aid a vessel undergoing compass adjustment process. It serves as a type of Mooring Buoy.
Reference: USNOO 1969

HAULING OFF BUOY. A Buoy positioned in midchannel or midpoint of a dock. It provides a fastening point for a ship debarking from its berth.
Reference: Kerchove 1961

MARK BUOY/MARK-BUOY. De Kerchove defines this Aid as one that denotes a special position with Marker Buoy as a synonym. Though USNOO defines the latter Buoy as a second name for Station Buoy. McEwen hyphenates the term.
References: De Kerchove 1961, McEwen 1953

MAST BUOY. This term is included in a listing of Buoys in Edwards. The author notes the difficultly of describing each of the many and diverse forms. No



further explanation is given of this Buoy.
Reference: Edwards 1884

MEASURED MILE BUOY. A Buoy that aids a vessel in determining calibration of ship log, engine revolution indicators, and speed by marking off a nautical mile.
Reference: IALA 1970

SEADROME BUOY. A Buoy that denotes boundaries and landing zone for aero operations within a navigable body of water.
References: Bowditch 1966

SURVEY OPERATIONS BUOY. Terms for Buoys used in surveying operations and dredging work. They display a white body with green top. They are a pre-IALA Buoy.
Reference: USNOO 1969

SWINGING BUOY. A Buoy so positioned as to aid a ship undergoing compass adjustment. It is an alternate name for Compass Adjustment Buoy which see.
Reference: USNOO 1969

1D Adjunct Terms: Systems, Marks, & Special Classification

1D1 Systems

General Comments. While the Database focusses on individual entities it cannot ignore the role of systems of Buoys. Systems are a vital element and very much intertwined with the various forms of Buoys. There are groups of terms to consider under the heading of systems:

1) Terms describing systems in general or which, at the least, transcend a given system. Three terms are especially notable: Uniform System of Buoyage, an older phrase applied to a variety of systems; Uniform System of Maritime Buoyage is an intermediate phrase; Maritime Buoyage, a more current phrase. The terms apply to both general and specific systems. This group also includes a variety of general terms which are virtually generic.

2) Buoys following a Lateral and/or Cardinal pattern. These terms are at the core of Buoy arrangements. There are also terms that refer to a combined Lateral/ Cardinal system.

3) Remaining system terms deal with three major systems: 19th/early 20th centuries efforts, League of Nation systems, finally IALA. The first segment incudes older systems and descendents of those earlier efforts.

a) General Terms

BUOY SYSTEMS/BUOYAGE SYSTEMS/BUOYAGE/SYSTEMS OF BUOYAGE/MARKING SYSTEMS/INTERNATIONAL BUOYAGE SYSTEMS. These are general terms that tend toward the generic. Specific information about a given system would be needed to define any of these terms, and employ them for a system.
References: Bury 1978, USNOO 1969, Kemp 1976

BUOYAGE & BUOY LIGHTING SYSTEMS OF THE WORLD. This is the name of a publication that incorporates systems and patterns before LN.
Reference: IHB 1926

INTERNATIONAL UNIFORM SYSTEM OF BUOYAGE/INTERNATIONAL UNIFORM SYSTEMS/UNIFORM SYSTEM OF BUOYAGE, LATERAL & CARDINAL. These terms can be regarded as variant forms of the previous terms; the previous comments apply here as well.
References: EB 1911, USNOO 1969, Bowditch 1966

MARITIME BUOYAGE SYSTEMS/SYSTEMS OF MARITIME BUOYAGE. These terms are the core of IHB publication titles for Buoy systems. Terms in IALA and LN reflect these earlier usages though LN's term is more of a variance.
References: IHB 1956, IHB 1971, LN 1936, IALA 1980, Bury 1978

UNIFORM SYSTEM/UNIFORM SYSTEM OF BUOYAGE. These terms, especially the second, are found in both capitalized and lower case forms. They are employed in the second half of the 19th century and continued well into the 20th. Its usage both as a generic term and as a specific term for multiple systems

can be confusing. The author, year of publication, and specific reference all need to be considered in determining the meaning of the usage of the term.
Reference: Bowditch 1966, Naish 1985, EB 1911, Bury 1978

UNIFORM SYSTEM OF MARITIME BUOYAGE. This term belongs to LN. It combines Uniform System with the newer Maritime Buoyage. It is a transition term from Uniform System to a stand-alone Maritime Buoyage term.
Reference: LN 1936, IHB 1956, IHB 1971

b) Cardinal and Lateral Forms

CARDINAL SYSTEM/CARDINAL SYSTEM OF BUOYAGE/CARDINAL SYSTEM OF MARKINGS/CARDINAL BUOYAGE/CARDINAL BUOYAGE MARKINGS/CARDINAL BUOYAGE SYSTEMS/UNIFORM CARDINAL SYSTEM. These terms originally referred to the direction of a danger rather than a location (such as the sides of a channel). However, IALA has expanded their usage and altered their meaning to denote the safest waters nearest the Aid as determined by the quadrant.
References: Bowen 1947, Burton 1980, Kerchove 1961, Ansted 1985

EXPANDED CARDINAL SYSTEM. This term refers to an early IALA effort in which Cardinal marks (referring to a danger) were joined by Cardinal Marks denoting location of wrecks. However, a much broader Cardinal system was subsequently developed beyond the restricted character of the earlier proposed expansion.
Reference: Bury 1978.

COMPASS SYSTEM/COMPASS-POINT SYSTEM/COMPASS-POINT SYSTEM OF BUOYAGE. Older terms for what later were termed Cardinal systems. The terms refer to the basis of the system: the Compass and its markings applied to Marine Aids to Navigation. IHB 1926 refers to both Compass and Cardinal Aids. It would seem that by the 1930s only the term Cardinal was in use.
References: IHB 1926, Naish 1985

DIRECTIONAL SYSTEM. Only Kemp 1976, among surveyed sources, includes

this term. It offers an alternate to the Cardinal system.
Reference: Kemp 1976

LATERAL SYSTEM/LATERAL SYSTEM OF BUOYAGE/UNIFORM LATERAL SYSTEM/SIDE-MARKING SYSTEM. These terms refer to systems in which Markings refer to a location; frequently the location refers to the sides of a channel (clearly seen in Kemp's term of Side-Marking System). Lateral systems are more effective where channels are clearly defined.
References: Bowen 1947, Bury 1978, USNOO 1969, Kerchove 1961, Kemp 1976

UNIFORM SYSTEMS-LATERAL & CARDINAL/COMBINED LATERAL & CARDINAL SYSTEMS. A few sources refer to a Combined Lateral and Cardinal System. Bowditch 1966 refers to a Uniform System--Lateral and Cardinal which is not a true combined system but rather adjoining systems or subsystems under LN. Bury 1978 refers to a true combined system which refers to IALA 1980. IALA refers to a Combined Buoyage System within the regions though the actual outline of the system follows a tripartite form.
References: IALA 1980, Bury 1978, Bowditch 1966

c) Older Systems: Red to Starboard Systems

INTRACOASTAL WATERWAY BUOY SYSTEM. A formulation by Tver 1987. He attaches "system" to Intracoastal Waterway which is an unusual usage. Most sources refer to Buoys in ICW.
Reference: Tver 1987

LIVERPOOL SYSTEM/WASHINGTON CODE/WASHINGTON SYSTEM/ WASHINGTON AGREEMENT. Mersey Harbor and Dock Board established a system of Buoys in 1846 with Red Buoys to starboard. This can be termed the Liverpool System. It spread to Scotland, the US then the International Marine Conference at Washington in 1889 (and most nations after that until St. Petersburg 1912 and LN 1930, LN 1936). Naish 1985 refers to these terms though few other sources do so in these forms.
References: Naish 1985, O'Dea 1959

1980

1D2 Marks

General Comments I. LN 1936, IALA, as well as some other sources, employ the more encompassing term "Mark" than Buoy in many instances. The term Mark means both Floating and Fixed Aids though quite likely many more are Floating than Fixed Aids. These terms are included here though descriptions are found with the specific Floating Aid in the Database (and in some instances in the Fixed Visual Aids part of the Database).

General Comments II. The term Floating Marks may seem to be misplaced since it is clearly a Buoy yet included under Marks. It is included since it contains the word Marks and thereby a member of this group.
References: LN 1936, IALA 1970, Kemp 1976, Burton 1980, Fifield 1980, Naish 1985, UK 1861

BIFURCATION MARKS
CARDINAL MARKS/CARDINAL MARKERS
FLOATING MARKS
ISOLATED DANGER MARKS
LATERAL MARKS
MIDDLE GROUND MARKS
PORTHAND MARKS/PORT HAND MARKS/PORT-HAND MARKS
SAFE WATER MARKS/SAFE-WATER MARKS
SPECIAL MARKS
STARBOARD HAND MARKS/STARBOARD HAND-MARKERS
WINTER MARKS

CABLE OR PIPELINE MARKS
MILITARY EXERCISE ZONE MARKS
OCEAN DATA ACQUISITION MARKS
RECREATION ZONE MARKS
SPOIL GROUND MARKS
TRAFFIC SEPARATION MARKS

Reference: IALA 1976

Additions from UN 1957 (and supplemented by futher entries from LN 1936)

BUOYAGE-MARKS, LN
CAN MARKS, LN
CHANNEL MARKS, UN
CONICAL MARKS, LN
JUNCTION MARKS, LN
LANDFALL MARKS, LN
MID-CHANNEL MARKS, LN/UN
MIDDLE GROUND MARKS/MIDDLE-GROUND MARKS, LN/UN
OUTFALL & SPOIL-GROUND MARKS, LN
QUARANTINE-GROUND MARKS, LN
SPAR MARKS, LN
SPHERICAL MARKS, LN
STARBOARD HAND MARKS/STARBOARD-HAND MARKS, Burton 1980 (L), Naish 1985 (R)
TRANSITION MARKS, LN
UNDEFINED MARKS, LN/UN
WRECK MARKS, UN

1D3 Special Classification Forms

General Comments. There are topics that impinge on the terminology of Buoys but are not part of the essential nature of the Buoy forms. One such topic is that of Bodies of Water in which Buoys are situated. Types and sizes of Buoys are affected by specific water configurations and some Buoy organizations recognize this and classify Buoys according to this criteria. Pharos Marine and US Coast Guard are two such groups. A second topic, and one closer to core concerns, is that of the classes or sizes of Buoys. In this instance the League of Nations and the US Coast Guard provide this information. Since class names are sometimes part of the name of a Buoy it may have been more appropriate to place such classes in regular entries. But those entries are already numerous and this addition would have been substantial. A Buoy of a given character and type retains that identity

no matter what size it may be.

a) Bodies of Water & Buoy Names

US Coast Guard:

MOST EXPOSED LOCATION (USCG 1979 refers to some Buoys as suitable for Most Exposed sites; if not an official state then it at least offers a descriptive term to note).
EXPOSED LOCATION (Sites hit by full force winds and seas).
SEMI-EXPOSED LOCATIONS (Partial protection from sea & wind provided by adjacent land masses).
SHELTERED LOCATIONS (Protected areas including harbor, river, smaller bays; newer USCG publications including USCG 1990 refer to:
PROTECTED LOCATIONS
MOST PROTECTED

Pharos Marine:

EXPOSED OPEN
OPEN SEA
MAJOR CHANNELS - MODERATE OR OPEN SEA
MAJOR CHANNELS - MODERATE OPEN SEA OR PARTIALLY SHELTERED
MINOR CHANNELS & HARBOURS
HARBORS - TURNING CIRCLE
ESTUARIES, SHALLOW & FAST FLOWING

b) Classes of Buoys Names:

LEAGUE OF NATIONS
CONICAL:
CLASS 1 12' x 16' 4"
2 10' x 13' 6"
3 8' x 10'

4 6' x 8' 2"
5 5' x 6' 9"

CAN & SPHERICAL (SAME SIZES FOR BOTH)

CLASS 1 12' (Width) x 12' 8" (Heighth)
2 10' x 10' 6"
3 8' x 8' 6"
4 6' x 6' 4"
5 5' x 5' 3"

Reference: LN 1936

US COAST GUARD CLASSIFICATION:

NUN & CAN
1-6TH CLASSES
TALL
1-3RD CLASSES
1-2ND SPECIAL CLASSES
FAST WATER
PLASTIC

SPAR
20'/30'/40'/50'

CONWAY 1915

IRON SPAR
1-3RD CLASSES

WOODEN SPAR
1-4TH CLASSES

Comments: While all classes can be regarded as a Buoy name, the Database will list the classes (sizes) as a component of the Buoy description rather than as names though that approach could be followed. Tall and Special Buoys are more often part of the commonly ascribed names of Buoys and are included both in description of types and coverage.
References: USCG 1964. USCG 1979, Conway 1915

BURY 1978 [FRAGMENTS]

STANDARD ESTUARY BUOYS
HIGH FOCAL PLANE BUOYS

Note: Bury 1978 includes only parts of a classification schema but it seems appropriate to include that partial formulation.

1E Major Floating Aids

Overarching Terms
Lightships & Light Vessels
Floats
LNBs/Landbys

1E1 Overarching Terms

FLOATING LIGHT. Edwards employs this term as a second term or alternate for Light Vessels.
Reference: Edwards 1884

LARGE FLOATING AIDS. An overarching term for Floating Aids other than Buoys. These include Lightships and Light Vessels, LNB/LANBY, Light Floats, and Lightboats. Seemingly only Sutton-Jones includes a term that can encompass all forms of large Aids that float.
Reference: Sutton-Jones 1985

LARGE FLOATING NAVIGATIONAL AIDS. Another informal term by Langmaid. Refers to Lightships rather than an umbrella term for all Large Aids that float yet it bears a strong resemblance to an overarching term.
Reference: Langmaid 1966

MAJOR FLOATING STATION. A term from Pharos Marine that designates their large Floating aids and may constitute an alternative for Large Floating Aids. Sutton-Jones, who contributed that later term, was managing director of Pharos Marine.
Reference: Pharos Marine, Sutton-Jones 1985

1E2 Lightships & Light Vessels

a) General Comments

General Comments I. Lightships and Light Vessels and their accompanying terminology represents a curious situation that contrasts with Buoys. Buoys consists of a class known as Buoys with many specific types within that class. LS/LV is a class which encompasses a single type yet there are a variety of terms to describe the class and type. The physical entity varies to a degree but the purpose of the essential equipment varies only to a limited degree. LS and LV are accompanied by two other groups of Large Floating Aids: Float and LNB/ LANBYs. References are found with individual entries. Lighthships and other Major Floating Aids are in the classification system but many forms are rare and/ or obsolete. Therefore full entries with classification numbers have not been included. Part C and Part D offer that information and further information on these Aids.

General Comments II. Primary terms are Lightship, Light-Ship, Light-Vessel, Light Vessel. There are at least 40 references in the survey for the lst ed. Overall, some 60% of the sources refer to Lightships and 40% to Lightvessels. Before 1925 more than half of the sources refer to Light-Vessels. While after that date Lightship becomes more common. Other terms (e.g. Relief Light-Vessel) favor terms that include the words Light Vessel. When variant terms are added to primary terms an even division between Light-Vessel and Light-Ship terms. results.

b) Lightships & Light Vessels

LIGHTSHIP/LIGHT-SHIP. A vessel displaying a powerful light and manifesting a fog signal, radiobeacon and painted in distinctive colors and patterns constitutes a Lightship. Lightships were usually self-propelled and anchored in significant areas where Lighthouses could not be established. Lightships, in a full sense, were often attended by a resident crew of several members. This form of Aid is all but extinct. Automatic Aids using altered Lightships or smaller Floats continue in use.

A single surveyed source, Putnam 1913, includes the term in a hyphenated form.
References: Naish 1985, Sutton-Jones 1985, Floherty 1942

LIGHTSHIP-SELF-PROPELLED. A historic term from Strobridge. Possibly the only reference to a Lightship in which the matter of propulsion is included in the title.
Reference: Strobridge 1974

LIGHTVESSEL/LIGHT VESSEL/LIGHT-VESSEL/LIGHT-VESSEL STATION. An alternate term for older Light Ships, and more often used for Light Ship before 1925. Some relatively new sources (e.g. Fifield, IALA 1991) prefer Light Vessel to Light Ship. While LV and LS are virtually interchangeable it seems possible that LV is a slightly broader term and can possibly encompass automatic versions of the Aid. There are a variety of terms attached to LV including Relief LV and terms referring to human presence/lack of human presence. One source, USLHS 1918, refers to a L-V Station which seems the equivalent to LV.
Reference: Fifield 1980, Sutton-Jones 1985, Adamson 1953, Kerchove 1961, Conway 1915, Chadwick 1971

RELIEF VESSEL/RELIEF LIGHT VESSEL/RELIEF SHIP/RELIEF LIGHTSHIP/RELIEF LIGHT-SHIP/SPARE LIGHT-VESSEL. This Aid acts as an replacement when the primary vessel requires periodic repairs, or may have been blown off station or is otherwise inoperative. Only limited sources include one or more of these terms; two speak simply of Relief Ships.
References: Weiss 1926, Conway 1915, USLHS 1918, USCG 1977, Tver 1987, UK 1861

FLOATING LIGHTHOUSE. This is not a recognized term. Floherty 1942 likens Lightship to a Lighthouse that floats: a "Floating Lighthouse" which is an apt and functionally accurate, if atypical description.
References: Floherty 1942, Phillips 1949

FLOATING LIGHT/FLOATING-LIGHT. Three sources employ this informal descriptive phrase. The Sutton-Jones 1985 reference is primarily to Buoys while

McCormick 1936 uses the term in reference to Lightships. UK 1861 has both hyphenated and non-hyphenated forms and they refer to Lightships.
Reference: Sutton-Jones 1985, McCormick 1936, UK 1861

c) Human-related Terms: Operation of Lightships & Light Vessels

ATTENDED LIGHT VESSEL/"MANNED" LIGHTVESSEL/UNATTENDED LIGHT VESSEL/UNATTENDED LIGHT-VESSEL/UN"MANNED" LIGHT VESSEL/UN"MANNED" LIGHT-VESSEL/AUTOMATIC LIGHTSHIP/ "MANNED" LIGHTSHIP/UN"MANNED" LIGHTSHIP/UNATTENDED LIGHTSHIP/AUTOMATIC UN"MANNED" LIGHTSHIP/UN "MANNED" LIGHT-VESSEL/LIGHT-VESSEL UNWATCHED. These terms explicitly indicate whether or not a human presence is attached to the Aid in question. Only a few sources include one or more of these terms.
References: Sutton-Jones 1985, EB 1911, IALA 1993, Fifield 1980, Naish 1985

1E3 Light Floats

LIGHTFLOAT/LIGHT FLOAT/LIGHT-FLOAT/GAS-LIGHT FLOAT/LIGHT-FLOAT STATION. These terms may create a somewhat vague image. Yet they refer to a relatively precise character. The core term and variants refer to Aids that are not of the Buoy form yet are not full-sized ships either and may not exhibit a ship-shape. In some instances the Float may have more of a barge shape. The term may seem to be of an older vintage yet references to the Aid are often of recent or relatively recent vintage. Almost invariably the Float refers to an automatic Aid. This Aid is a substitute and replacement for LV/LS and may be preferable to LNBs/LANBYs. The word "Boat" is part of the title of several forms of Floats. Glas-Light Float is an older Aid as can be seen by the inclusion of the energy source in the title. Langmaid includes Light-Float Station which is seemingly a variant form.
References: Fifield 1980, Naish 1985, Hague and Christie 1975, Langmaid 1966.

AUTOMATIC LIGHT FLOAT/AUTOMATIC LIGHT-FLOAT/UN "MANNED" LIGHTFLOAT/UN"MANNED" LIGHT FLOAT. These terms make explicit what the unadorned term Lightfloat implies. The first three terms

are from Sutton-Jones 1985. These Aids include a relatively new form from AGA (now Pharos Marine) which may be an actual ship though smaller than a traditional LS/LV. The need for a Major Floating Aid of a more economical nature created a need for these Aids.
References: Sutton-Jones 1985, Pearsall 1990

LIGHT-BOAT/LIGHTBOAT/BOAT FLOAT/UNATTENDED LIGHTBOAT/ BOAT BEACON/GAS BOAT. These terms seem to be the equivalent of Lightfloats though it may denote a Marking that is boat-shaped. Float may indicate a more uncertain term which suggests something that floats and is larger than a buoy; it can be in the shape of a boat, small barge, or other shape.
References: Naish 1985, Kerchove 1961, Layton 1982, Bowen 1947, McCormick 1936

CATAMARAN/GRP CATAMARAN. A term that is included in only a few sources. Pharos Marine includes what they term a GRP Catamaran. It is a twin-hulled craft with a powerful light apparatus. The Catamaran is, with its very shallow draft, designed for shallow estuary locations with fast flowing waters. GRP refers to Glass Reinforced Plastic (or fiberglass in US parlance).
Reference: Pharos Marine

NOMAD WEATHER LIGHT-FLOAT. Langmaid's treatment of Light-Floats included two Floats whose was not primarily as an Aid to Navigation. However, the Floats maintained a secondary role in navigation.
Reference: Langmaid 1966

1E4 Large Navigational Buoys

LNB/LARGE NAVIGATIONAL BUOY/LANBY/LANDBY BUOY/LARGE AUTOMATIC NAVIGATION BUOY. LNB refers to Large Navigational Buoy (US). LANBY or Large Automatic Navigational Buoy (UK). These Aids were developed in the 1960s/1970s. They constitute a Buoy yet one of very considerable size with a central tower, powerful light and other devices. They are classified as a Buoy not as a Float. The Aid, in the view of Naish 1985, has not been altogether fully successful. Trinity House, for example, has opted to

retrofitting older LS rather than expanding the use of LANBYs. Naish claims LANBYs are termed Light Floats in America which does not seem to be the case.
Reference: Tver 1987, Naish 1985, Chadwick 1971, Monroe & Stewart 2005

SUPERBUOY. A term employed by two surveyed sources. It would seem to be a synonym for LNBs and LANBYs.
References: Swedish Adm. 1985, USNOO 1981

LARGE BUOY. This may be an overly general term for inclusion. Yet Pearsall includes it as an apparent synonym for LNBs/LANBYs.
Reference: Pearsall 1990

LIGHTHOUSE BUOY. USNOO 1981 and USNOO Pilot Chart 1977 refers to Lighthouse Buoys in remarks on IALA's original System A while IALA publications refers to Large Navigation Buoys. Lighthouse Buoy seemingly constitutes a synonym for LNB. Further explanation of the term Lighthouse Buoy is not readily available.
Reference: USNOO 1981, USNOO 1977, IALA 1976

CHAPTER TWO

FIXED LIGHTS

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1A2 Alphabetical Index

2B1 General Overarching Terms

FIXED AIDS TO NAVIGATION. This term includes Fixed Lights but goes beyond that category and includes Radio Aids, and Fog Signals of a fixed character as well. It is too inclusive to be an adequate overarching term for Fixed Lights yet it is closely tied to Fixed Lights. Origin of the term is unclear. IALA speaks of Fixed Marks. USCG includes frequent references to Aids to Navigation. And the word Fixed appears in the literature in various contexts. Is there a precise source for Fixed Aids to Navigation? Or was it, at least in part, a conflation by the compiler of separate terms? It first appears in Part B, 1992 (2nd ed). A recent computer search uncovers a use of the term by the Canadian group Norvan of Canadian Power Squadron.
Reference: Part B, Norvan-CPS

FIXED LIGHTS. The selection of an overarching term for Fixed Marine Lights Aids may appear to be obvious: Lighthouse. However, the matter is more complex than that. Lighthouse is increasingly a popular and historical term employed only to a limited degree by maritime agencies. And while Lighthouse -- when employed loosely -- can encompass all significant fixed Lighted Aids it refers more precisely to towers and other enclosed dwellings displaying a light. Some sources, including IALA 1970, suggest human presence is needed for a Lighthouse. Poles and other minimal structures -- even when equipped with a powerful light -- are questionable candidates for the Lighthouse category. The term Light is often utilized for the structure and for the complete assembly and not merely the light mechanism and emission of light energy in a specific pattern. Yet that term contains a measure of confusion, and Floating Aids can find incorporation in a Lights category.

A more plausible term is that of Fixed Lights. It denotes Aids with lights but only those of a fixed location. It offers a workable term for the complete assembly of lights at a fixed site and the term finds employment in maritime sources. IALA sees a Fixed Light as a Light affixed to a fixed structure rather than on a floating base. However, IALA views that definition somewhat loosely. IALA defines

Light in three ways: Light as visible radiant energy; Light as an apparatus that gives off light; Light as an assemblage of light generating apparatus with a support structure. IALA's definition offers a strong support for employing Fixed Light as the overarching term for the Database.

It should be noted that Fixed Lights serves as the general term for Lighted Aids on a fixed site. There are two categories in Fixed Lights: Major and Minor Aids. Thus Fixed Lights is a general term that encompasses very diverse terms that are not -- in a sense -- fully at ease with one other. Overarching terms for Fixed Lights includes general overarching terms, and overarching terms for Major Lights, and Minor Lights.
References: Kerchove 1961, Beaver 1973, IALA 1970

LIGHT. As note under Fixed Lights, the term Light can serve as an overarching term for Lights that are in fixed positions. Yet some measure of confusion can be present in that single word. Therefore, Light alone is not the primary overarching term for this Database. Light may be workable for those familiar with marine terminology but the unsuspecting and occasional user of such terms may become confused over the usage of the word Light. The discussion over Fixed Light may reduce confusion over matters of meaning. References can include most source materials. A representative sampling of sources is included:
References: IALA 1970, Adamson 1953

LIGHT ON FIXED STRUCTURE. A possible overarching term since it combines Lights with a fixed structure. It is not employed extensively and is a more awkward term than Fixed Light though a plausible alternative.
Reference: USCG 1959

LIGHTED AID. This term is employed by few sources. It is a possible over-arching terms for Fixed Lights but it also includes Floating Lights and thereby not fully adequate for the category at hand.
Reference: Conway 1915

(LIGHT) BEACON/LIGHT BEACON/LIGHT-BEACON. IALA adds clarifying words within ( ) to better explain the use of various terms. The added word is

probably not part of the recognized term. IALA groups this term with Light (Definition No. 3) and Lighthouse. Beacon often suggests an unlighted Aid or a general term encompassing all Marine Aids to Navigation. It will not be a primary term for Lighted Aids though it can not be dismissed as a possible candidate.
Reference: IALA 1970

LIGHTED BEACON. This may suggest a Minor Light though USNOO 1969 speaks of it in general terms and notes that a powerful Lighted Beacon is known as a Lighthouse. It can therefore be viewed as a possible term for the full range of Lighted Marine Aids.
Reference: USNOO 1969

LIGHTED MARK. This term includes not only Fixed Lighted but Floating Aids with lights as well.
Reference: Naish 1985

MARINE LIGHT. A possible overarching term. USNOO sees the term as representing Marine Aids to Navigation. It is seemingly employed by few other references. It suggests lights in marine situations which could include non-Aid uses. The term can also include Floating Aids and probably becomes overly inclusive.
Reference: USNOO 1969

MARITIME LIGHTING. This term appears in UK 1861 and possibly in no other source. It offers a plausible though perhaps overly inclusive alternative for an overarching term.
Reference: UK 1861

2B2 Overarching Terms for Major Lights

BEACON-FIRE. This term can refer to early and simple Aids. Adams 1884 also appears to employ the term as an informal term for contemporary Aids including those of modest forms.
References: Edwards 1884, Adams 1870

BEACON-LIGHT. A possible -- and informal -- term for early Lighthouses.
Reference: Adams 1870

BEACON TOWER. This constitutes an informal term for Major Lighthouses.
Reference: Phillips 1949

BLAZING BEACON. Term for early marine Aid in an 19th century source.
Reference: Edwards 1884

COAST LIGHTS/COASTAL LIGHTS/COASTWISE LIGHTS . These terms are both physical and morphological. It proves very difficult to determine the precise character of each term. Since the terms tend toward the morpological, the principal entries for these terms and related terms are to be found in the morphological segment of this chapter.
References: Johnson 1890, Beaver 1973, Langmaid 1966

ELECTRIC LIGHT STATION. A 19th century for a Light House station operating on electric power. Inclusion of energy source in title may denote early term.
Reference: Edwards 1884

ENCLOSED TOWER. Term employed in T-M studies primarily for Minor Lights. It may be a borrowing from an unidentified source or an extrapolation from the literature.
References: Parts C/D. Part H

FIRE TOWER. Term refers to early and primitive Aids both in ancient and medieval world, and to early modern times in Europe. They displayed open fires set atop open towers.
References: Adams 1870, Edwards 1884, Naish 1985

FREESTANDING LIGHT/LIGHT ATTACHED TO KEEPER'S DWELLING/ ROOF-MOUNTED LIGHT. These terms may not appear to be of an overarching nature yet in Nova Scotia they provide a three-part schema of classifying Light-houses.

Reference: Stephens 1973

HOUSE ON SPECIAL MARINE FOUNDATION/HOUSE ON STRUCTURE. These terms are employed in T-M classification as a means to bring together diverse specific Aids. Terms employing Special Marine Foundations originate in USCG Aids to Navigation sources.
References: USCG 1964, Parts C/D, Part H

LAKE LIGHT-HOUSE. Only Johnson 1890 has this term. It is a sub-overarching term that encompasses Lighthouses for the "unsalted seas."
Reference: Johnson 1890

LAND LIGHTHOUSES/LAND LIGHTS/LAND STRUCTURES/LAND TOWERS. These terms, while of a general nature are, nonetheless, a usable description for this group of Lights.
References: EB 1910, Beaver 1973, Phillips 1949

LIGHTHOUSE/LIGHT-HOUSE/LIGHT HOUSE. Lighthouse is both an overarching term and also a generic term for Fixed Lights of considerable power and significant structure. IALA seemingly restricts the term to Lights with resident keepers though few Lights have keepers any longer (though keepers would have been less rare in 1970). The term becomes virtually a synonym for all Marine Aids to Navigation since general treatises often include Lighthouse as a key word in the title. Lighthouse includes both the light apparatus and supporting structure.
References: IALA 1970, Bowen 1947, Tver 1987. O'Dea 1958 (and most of the sources for this study)

LIGHTHOUSE BEACON. This term supplied by Sutton-Jones suggests a Lighthouse or Major Beacon as a high-powered Light but lacking a traditional form. See also Major Beacon.
Reference: Sutton-Jones 1985

LIGHTHOUSE SYSTEM. A term that suggests the complete encompassing world of the Lighthouse including research, operation, maintenance and literature

of the subject.
Reference: Kettle 1896

LIGHT STATION/LIGHT-STATION. This term includes all of the buildings and other structures relating to a Lighthouse. It can be a near synonym if one views the term Lighthouse as including all of the support structures that accompany the core structure of the Lighthouse.
References: Putnam 1913, Gibbs 1974, Dutton 1958, Johnson 1890

LIGHT-TOWER/LIGHT TOWER. This term is a more accurate designation for those entities known as Lighthouses. But only a few surveyed sources include it and they are mostly British sources.
References: Hague & Christie 1975, Naish 1985

LIGHTED COASTAL BEACON. A term that seemingly includes all forms of what can be termed Lighthouses.
References: Langmaid 1966

LIGHTED TOWER. Term from Bathurst which seemingly includes both ancient and more modern marine Aids employing a tower and a light of some form or other.
Reference: Bathurst 1999

MAJOR BEACON. This term supplied by Sutton-Jones reflects British usage of Beacon for a Marine Light. In this case it refers to Major Lights not Minor Lights. No other surveyed source included it.
Reference: Sutton-Jones 1985

MAJOR LIGHTS. A significant term though perhaps not entirely precise. To some degree it can be a synonym for Lighthouse. It includes Lights of considerable power at key points on and near coasts as well as more important inland Lights.
References: Sutton-Jones 1985, Weiss 1918

MAJOR LIGHT STRUCTURES. This term is employed only by USCG 1964. It

focusses on the support structures for significant Lights most of whom can be termed Lighthouses.
Reference: USCG 1964

NAVIGATION LIGHT/NAVIGATIONAL LIGHT. These terms appear to be too general for inclusion. Yet IALA and a few other sources include them as a Marine Light terms. It does not constitute a core term for the Database.
References: IALA 1970, Weems 1940, Hague & Christie 1975

NON-TOWERS. A term in T-M Studies employed in classification of Houses, Buildings, Composite Structures.
References: Part H

OFFSHORE LIGHT/OFFSHORE LIGHTHOUSE. This term with variant form is possibly unique to Langmaid 1966. They refer to Island Lighthouses but not Rock Lighthouses. It fits within the broader category of Sea-Girt Lighthouses.
Reference: Langmaid 1966

OIL STATION. Term from Edwards for Lighthouse installation and apparatus fueled by oil. Employing energy source in title indicative of older term.
Reference: Edwards 1884

OPEN TOWER. Classification term in T-M Studies for Towers of Skeleton and Framework character.
Reference: Part H

OPENWORK STRUCTURES. This term is apparently employed only by Douglas & Gedy in EB 1910. It offers an encompassing term for all forms of structures not enclosed: Offshore Light Platforms, Screw-Pile Lighthouses and other Aids employing piling in some form. It can also apply to Skeleton Towers and Skeleton Structures on land.
Reference: EB 1910

PHARE/FAROS/PHARUS/PHAROS. Phare is the French term for Lighthouse. It comes from the term Pharos which is central to Lighthouses from ancient times. It

is included in IALA 1970. The accompanying term of Faro is in use in Italy, Spain, and Portugal. Pharus is the Latin and core form.
Reference: Beaver 1973, IALA 1970

PRIMARY SEACOAST LIGHT. While this can be an overarching term it is probably more of a morphological entry. It includes a vast array of Lights yet such lights exhibit narrow range of purposes. The morphology category includes this Light as well.
Reference: Tver 1987, USLHS 1918

ROCK STATIONS. A term in Johnson 1890 that is seemingly equivalent to Rock Towers.
Reference: Johnson 1890

ROCK TOWERS. A perhaps questionable entry for an overarching terms yet it encompasses a large element of Wave-Swept Lights and can be regarded as a sub-overarching term. It is also an entry in the listing of types of Major Light Structures.
Reference: Beaver 1975

SEACOAST LIGHTS. USCG may be the solitary user of this term. Formerly USCG spoke of Primary Seacoast Lights but Lights have been devalued and various Major Lights are lumped together whether Seacoast or Secondary Lights. Seacoast encompasses a broad range of Lights and can be regarded as an overarching term yet there is at least a hint of morphology in the term and may refer to function though the overarching meaning is greater.
Reference: USCG LL PC 1991

SEA-LIGHTS/SEA LIGHTS. This term suggests a broad and encompassing term that could rival Lighthouse as a general designation for Lights on and near coast-lines. However, only a few surveyed sources include it; they are all UK sources. Beaver 1973 hyphenates the term.
References: Beaver 1973, O'Dea 1958

SEA-GIRT TOWERS. A phrase appearing in Parts C/D of the Series. It refers to

Lights surrounded by water and may constitute a broader term than Wave-swept and Sea-swept since Sea-girt may indicate Lights surrounded by water whether in turbulent open sea or inland waters. Sea-Girt Towers are influenced by existing terminology even if the exact phrase has been coined.
Reference: Parts C/D

SEA-NAVIGATIONAL LIGHT. Langmaid adds this to his large collection of informal overarching terms. No other surveyed source included it.
Reference: Langmaid 1966

SEA-SWEPT LIGHTHOUSES. A single source employs this term. It can be regarded as the equivalent of Wave-swept Lighthouse.
Reference: Putnam 1913

SECONDARY LIGHTS/SECONDARY COASTAL LIGHT. This is also a partly overarching and partly-morphological term. It includes a wide spectrum of not quite Primary Lights located in both coastal and inland locales. But it can also suggest a functional meaning. Lights that are neither Landfall nor Headland as well as Lighthouses in inland waters are often labelled Secondary.
References: Bowen 1947, USNOO 1969, Beaver 1973, Whitney 1975

SHORE STRUCTURES/SHORE LIGHTS. A very general expression that describes more than it defines a class of lights. But terminology for Lights on land are frequently less precise and less common than those for marine sites. These terms offer a possible group identification.
Reference: Langmaid 1966, Putnam 1913

STRUCTURES ON ISLANDS AND PROMONTORIES. Companion term to the following term. It refers to Lights at relatively high elevations.
Reference: USCG 1964

TALL COASTAL TOWERS. USCG 1964 does not offer a single term for Major Lights on shore. Instead that class of Lights is divided into low elevations entities under the heading of Tall Coastal Towers and high elevations stations under the heading of Structures on Islands and Promontories.

Reference: USCG 1964

TOWERS. This is seemingly a basic term yet rarely employed without qualification.
Reference: Langmaid 1966

TOWER ATTACHED TO HOUSE/BUILDING/TOWER ON SKELETON STRUCTURE/TOWER ON SPECIAL MARINE FOUNDATION/TOWER ON ROCKS. These terms are employed primarily in T-M classifications as a means for drawing together diverse Aids. Terms employing Special Marine Foundations have their origins in USCG Aids to Navigation publications.
References: USCG 1964, Parts C/D, Part H

WAVE-EXPOSED TOWER. A possibly coined term for Part J. It can serve as an alternative for Wave-Swept Lighthouses and related terms.
Refeences: Part J

WAVE-SWEPT LIGHTHOUSES/WAVE-SWEPT TOWERS/WAVE-SWEPT STRUCTURES. These terms refer to Fixed Lights -- usually of a major designation -- exposed to the sea. Rock Lighthouses, Lights on pilings, etc. would be examples of the category.
References: USCG 1964, Beaver 1973, Conway 1915

2B3 Overarching Terms for Minor Lights

BEACON/BEACON LIGHT/BEACON-LIGHT/STONE BEACON/WOODEN BEACON/IRON BEACON. This term is employed by Sutton-Jones 1985. It may refer to the Light apparatus of the Beacon rather than represent another term for Minor Light as a complete assembly. Beacon can include Major Lights and also Floating Lights. There is also Beacon with the meaning of overarching term. Kettle provides three forms with the material of constructions. They may suggest Unlighted Beacons but they may also have a lighted form.
Reference: Sutton-Jones 1985, Johnson 1890, Kettle 1896

HARBOR LIGHT/HARBOR-LIGHT/LOCAL HARBOR LIGHT. This is a basic

term for Minor Lights. USCG refers frequently to River and Harbor Lights and this occurs more often in references to Minor Lights. Harbor Lights are smaller both in structure and light intensity than various Coastal Lights. Such Lights are located in river, bay, and harbor areas and project messages for a restricted locale. They are often integrated into the Lateral System of Buoyage.
References: USCG LL PC 1991 and other editions; Johnson 1890, Phillips 1949 (Local Harbor Light)

(LIGHT) BEACON/LIGHT BEACON/LIGHTED BEACON. These terms are listed in Overarching Terms-General. They can also be seen as Minor Light terms and are more likely candidates for Minor Lights than for general usage. Various sources seem to employ Light Beacon and Beacon Light as virtual synonyms.
References: USNOO 1969, IALA 1970

LOCAL LIGHT. One source refers to Local Lights which may represent a vague equivalent of River and Harbor Lights.
Reference: Hague and Christie 1975

MINOR LIGHT. The primary term for less powerful and less significant Fixed Lights. Structures, intensity of lights and spheres of operation are generally modest and restricted for this form. River and Harbor Lights are the main terms within Minor Lights.
References: Naish 1985, Weiss 1926, Bowen 1947

OTHER LIGHTS. A few sources refer to Other Lights. Possibly a term that brings together any remaining forms of Lights; perhaps this should be a General term.
References: USLHS 1918, USCG-LL in various editions

RIVER LIGHT/RIVERINE LIGHT/RIVER BEACON. River Light is akin to Harbor Light; the two terms are often conjoined. River Light is perhaps more restricted in location and may often display greater consistency than the Harbor Light in employing small and modest structures with limited power light apparatus. Sutton-Jones employs an apparent British form with Riverine Light. Sutton-Jones also refers to River Beacon in the sense of a Lighted Beacon and one

that encompasses the various forms of River Lights.
References: Sutton-Jones 1985, Holland 1972

SHORE & HARBOR LIGHTS. This may represent a coined term for Major Shore and Minor Harbor Lights.Reference: Part J

SUPPORT/WOODEN SUPPORT/IRON SUPPORT. Kettle includes several Aids that employ Supports. It is a possible overarching term though seemingly it was in rarely used. Kettle uses qualified forms only.
Reference: Kettle 1896

2C Major Light Forms

2C1 Subdivisions

Note to Major Categories: Marine Sites & Shore Sites

A special problem quickly surfaces for these Aids: what are the subdivisions and what are they called? The USCG offers an outline (now altered) for Fixed Lights: Primary Seacoast (now omitted), Seacoast, Secondary, River, Harbor and "other lights." But there is a vast array of physical differnces within any of those categories. The structures can include a lofty soaring tower on a waveswept rock and a tiny structure of cast iron plates on a headland. Yet the subdivisions do not take note of structures. And structures are only one element: the day portion. Maritime agencies include the type of structure in light lists and classifications of structures are easily determined. But the types of structures are not types and names in the sense of, for example, a Diaphone Fog Signal, or a Rotating Radio-beacon. The Light structure names and types are more in the nature of a descrip-tive tool and lack a more definitive role. Yet merging all of the Fixed Lights, especially major forms, into a few categories (which are based on intensity of the light, and location with less attention to structure) seems inadequate. Yet including all forms of structures and nuanced differences as separate forms degenerates quickly into bewildering minutiae. Also, structures are simply not "types" as are various forms of Buoys or Fog Signals. Yet the structures are a vital element even if not fully a type, and even if the names of the structure lack the precision and official nature

of names of types of other Aids. Structures will therefore be included even if informally named, and even if titles and types take on a provisional character.

A related issue on types occurs in the literature for Lighthouses: numerous sources begin with the archtype of Lighthouse and then proceed to the individual Lighthouse (often in an anecedotal format) without subdivisions into types. This is contrary to treatments of other Marine Aids in which subdivisions are present though not individual entities. This is to be expected since Buoys, Fog Signals, etc. lack the notable "personal" character of a traditional Lighthouse (this may be more true of Buoys since some Fog Signals are regarded as specific entities in their own right). The end result is a vast array of terms (types) for many forms of Marine Aids, and relatively few terms for Lighthouses. Lighthouses are seemingly individual with only a few general categories (Primary, Harbor, etc).

Perhaps types do exist though based less on the physical entity (physiology to borrow a term of biology) and more on function (morphology). Terms such as Headland Lights, Range Lights and other terms are the types for Lighthouses and other Fixed Lights. The Morphological category can also be a types category. Function is related to the physical since a Landfall Light is found in certain areas, has one of several specific building forms, and has a powerful light. This Database will include types for Fixed Lights though their character is partly at odds with types for other Aids. And these types are fewer in number than types for other Aids. Types, in a morphological sense, bridges the gap between the structure of the Fixed Aid and the light apparatus and emission that appears when separate discussions on structures and lights takes place. Function necessarily includes both the light portion and the necessary support structure.

WAVE-SWEPT TOWERS/WAVE-SWEPT STRUCTURE/SEA-GIRT LIGHTHOUSES/SEA-SWEPT LIGHTHOUSES/WAVE-EXPOSED TOWERS/ WAVE-SWEPT LIGHTHOUSES.

General Comments. This constitutes one of two groups or classes of Major Light Structures (or Lighthouses when employed as a generic term and not tied to a specific building form). These structures may be found on both natural and

"artificial" foundations. Rocks, when visible, may be very restricted in size and may be underwater at high tide or awash when seas break over them. "Special Marine Foundations" (a USCG term for Minor Aids but which can be applied here) may be necessary for many Wave-Swept Aids and include several forms of caisson, pilings (in several forms), crib and rock foundations. USCG 1964 refers to Wave-Swept Structures and that is probably more accurate since not all of these entries are towers (but neither are many or most "houses" as in Light-houses). Putnam 1913 employs Sea-Swept Lighthouses. This compiler used Sea-girt in Parts C/D, and that had the advantage of indicating water-surrounded Aids and not merely those in the open sea. The following entries include the forms of Wave-Swept Lights so far identified. A variety of the following terms, including those referring to brick, stone, masonry, and concrete, seem to be of a very general nature and thereby lack a precise application to their function. None-theless, an abundance of such terms appears in the literature. The last-named Aid appears in Part J; original source -- if there is one -- is unknown.

Classification #: 221
Form of Aid: Major Marine Fixed Light
Operation: A primarily visual message assembly of a powerful light mounted on or in a distinctive structure. The Aid is situated on an isolated rock or island within a major body of water or in close proximity to one. Design and coloration pattern of the structure constitutes the Daymark of the Aid. Acoustic and Radio Aids may be present.
Comments: See Above.
References: The references for the aforementioned terms are located under the individual entries.

LAND TOWERS/LAND STRUCTURES.
Comments I: These terms are less explicit and less common than Wave-Swept Structures and allied terms. The focus in the literature is on the more spectacular Rock Lighthouses, etc. both as a class and as individuals. That may partially explain the less precise terms of Shore Sites. The above terms may not constitute a fully official designation; they are to some degree terms of convenience. They denote structures on land; structures away from direct contact with the sea. Douglas and Gedy (EB 1910) offer substantial data on Wave-Swept Structures

but pass quickly over Land Structures. USCG 1964 divides land forms into Structures on Islands and Promontories and Tall Coastal Towers; USCG lacks a general term for those forms.
References: EB 1910 can be viewed as a reference at least for Land Structures. Beaver 1973 suggests the terms in a general way.

Comments II: Terms for these forms are problematical: classification and terms that do exist tend to refer to building materials, but listings of lights refer to shapes, colors, bands, and stripes. Therefore, official terms for specific types are lacking. Possibly a listing of what terms and descriptions are available may suffice somewhat in the format of Topmarks and Daymarks in the Daybeacon segment. Much of what follows stems from a survey of USNOO/DMA for Parts C/D (lst ed., 1981, and included in 2nd ed., 1988).

Land Structures-Types
Openwork Structures: Steel Towers (variously termed Structural, Lattice, Skeleton); Skeleton Wooden Towers.
Enclosed Structures: Towers (Enameled Panels, Cast Iron Plates, Granite, Brick, Stone-undifferentiated, Concrete, Wood); Buildings, Houses.
Shapes: Conical, Cylindrical, Octagonal, Pyramidal, Hexagonal, Round, Truncated-Pyramidal-Octagonal, Triangular, Skeleton Towers, Composite-Tower/Dwelling.
Colors: White, Red, Black, Yellow, Black/White, Red/White, Red/Yellow (for Towers; trim and lantern house may also display differences in color from Towers).
Other Patterns: Stripes, Bands, Checks.

Classification #: 222
Form of Aid: Major Marine Fixed Light
Operation: Power light mounted on a house, tower or other structure. These are land-based but usually on the outer ramparts of a coastal region and adjacent to a key body of water. The day portion is more likely to display colored bands, stripes or other patterns than seagirt forms. The daymarkings draw attention to the Light and distinguishes it from the surrounding terrain and other structures.
Comments: #222 refers specificaly to Major Structures: Land-Based Towers in

the classification.

2C2 Individual Forms

MAJOR LIGHTS-INDIVIDUAL ENTRIES (Classified according to the following schema:

L= Probably land-based
LT= Either land- or marine-based but tending toward land
LM= Land-based more likely
M= Marine
A number of the categories can be marine when combined with a special marine foundation.

BUILDINGS/WOODEN BUILDING. **L**. Few sources include this term. It occurs in the surveys from USNOO/DMA including Parts C/D; Kettle 1896 light listings also includes it. The term is vague and suggests a structure other than tower or house. Presumably it was a distinctive structure. It appears to be an exceptional term and applied to few Lights. Wooden Building is a variant form from Kettle.
References: Parts C/D, Kettle 1896

BRICK TOWERS. **LT**. Presumably these Towers are largely found at land-based sites including islands. There is some confusion over the meaning of Masonry. For a variety of sources masonary refers to stone work. Seemingly in US parlance masonry refers to brick construction.
Reference: USCG 1964

CAISSON FOUNDATION. **M**. This a distinctive structure but not a Lighthouse in itself. But it does define and shape the dwelling and lantern assembly and a possible tower that surmounting the Caisson. Caissons are of several forms and consists esentially of a large steel tank installed on the harbor or sea bottom.

CAST IRON LIGHTHOUSE/CAST-IRON LIGHTHOUSE/CAST IRON TOWER/CAST IRON PLATE TOWER/ IRON FRAME/IRON-FRAMEWORK LIGHT-HOUSE/IRON FRAMEWORK LIGHTHOUSE/IRON FRAMEWORK TOWER/IRON LIGHTHOUSE/IRON LIGHT-HOUSE/IRON PILE LIGHT-

HOUSE/IRON PYRAMIDAL FRAMEWORK LIGHT-HOUSE/IRON-SKELETON LIGHT-HOUSE/SKELETON IRON LIGHT-HOUSE/IRON TOWER/OPEN IRON STRUCTURE/OPEN IRON TOWER/PYRAMIDAL IRON SKELETON TOWER/SKELETON WROUGHT-IRON TOWER/ SKELETON WROUGHT IRON TOWER/WROUGHT-IRON OPEN FRAMEWORK STRUCTURE. This group of terms includes the range of Major Lights using iron in their construction including both marine and land forms. Iron plates, cast iron and wrought iron are all employed. Both openwork and enclosed models are represented. Langton-Jones 1944 offers a more extensive version, Wrought-Iron Open Framework Structure which may conjure up several structural forms.
References: H & C 1075, EB 1910, Beaver 1973, USCG 1964, Putnam 1913, Kettle 1896, Langton-Jones 1944

CONCRETE CAISSON TOWER. **M**. An alternate name for the Telescopic Tower.
Reference: H & C 1975

CONCRETE TOWER/MONOLITHIC CONCRETE TOWER. **LT**. This term includes reinforced concrete and concrete block structures. Concrete Caisson forms (Telescopic Towers) are closely related. USCG 1964 adds the Monolithic to some forms of tall structures including those of concrete. EB 1910 placed Concrete Towers within Masonry Towers.
References: USCG 1964, EB 1910

CRIB FOUNDATIONS. **M**. A special foundation type included in USCG 1964 and formerly employed in traditional marine constructions. It consisted, essentially, of a large box of rocks. More precisely a crib is a timber structure divided into pockets which are filled with stones. The size and water location of the crib dictates what is built on it: possibly a compact tower or a dwelling and tower of short dimensions. The US Great Lakes are the location of many Lights of this form.
Reference: USCG 1964

CYLINDER. **M**. An alternate name for Caission Foundations employed by

Douglas & Gedye in EB 1910.
Reference: EB 1910

DWELLING. A term from Kettle. Is Dwelling interchangeable with the term House? Possibly a local usage that is included by Kettle. It is an infrequently employed term and possibly historic.
Reference: Kettle 1896

ENAMELED PANELS ON STEEL TOWERS. **L.** In this form panels are fastened to a steel tower thereby creating an enclosed edifice. Possibly only one model is extant.
Reference: USCG 1964

FRAME TOWER/FRAMEWORK/FRAMEWORK TOWERS. **L.** Terms found in Parts C/D surveys and in Kettle. They suggest an open structure which is possibly of a bulky appearance and formed of timbers.
References: Parts C/D, Kettle 1896

GRANITE TOWERS. **L/M.** USCG 1964 tends toward the the specific in describing Towers and their construction materials. The term Masonry refers to bricks for USCG and is not an encompassing term for brick and stone let alone stone by itself.
Reference: USCG 1964

HOUSE/WOODEN HOUSE. **L.** Parts C/D surveys and Kettle include this as a light-bearing structure. In some instances a light structure in the form of a tower was attached to or emanated from a house. But a House with light suggests the house is the primary or exclusive structure. Few Light-Houses, of course, have any resemblance to what might be termed a House in a sense of a dwelling.
References: Parts C/D, Kettle 1896

IRON PILE IN CORAL. **M.** A rare form from the past. It was employed in the 19th century in the US and consisted of driven piles rather than screw piles. Dwelling and tower consisted of a skeleton framework which included living, work and equipment spaces. Utilized several times on the Florida coast.

Reference: USCG 1964

MASONRY TOWERS. **LT.** This is possibly a generic term for both Stone and Brick towers though British sources seem to equate masonry with stone. Both EB 1910 and H & C 1975 reflect that usage. US sources appear to equate masonry with both building materials; if one construction material is intended that form is brick in the US. Rock Towers will lack stuccoed or painted surfaces and the building material is visible. Land forms may obscure the materials by paint or stucco. Masonry Towers may also constitute a undifferentiated term.
References: H & C 1975, EB 1910, Beaver 1973, USCG 1964

OFFSHORE LIGHT PLATFORM/PLATFORM LIGHT. **M.** This structure, heavily influenced by oil-rig technology, has been employed to replace Lightships. The template structure and legs are fastened to pilings driven into the sea bottom. Concrete is poured into both legs and piles in order to create a solid and unified structure. The horizontal structure houses necessary living, equipment and work spaces. It also provides a helipad and foundation for the tower displaying the light. Platform Light is seemingly a shorter version of the full title.
Reference: USCG 1964, Naish 1985

PILE LIGHTHOUSE/PILE LIGHT-HOUSE. **M.** This is seemingly an encompassing for Lighthouses built on piles without regard to materials of construction or method of installing the piles. Many such installations are of the screw-pile form. UK 1861 offers a hyphenated version of the term.
References: USNOO 1969, H & C 1975, UK 1861

ROCK TOWER/ROCK LIGHTHOUSE/ROCK STATION/ROCK LIGHTHOUSE TOWER. **M.** Some sources refer to Wave-Swept Lighthouses followed by descriptions of the various forms of Towers but other sources, including H & C, offer a subdivision of Wave- Swept forms that encompasses all entities located on tiny, sea-washed and even barely visible rocks. H & C notes that some sources refer to Rock Towers while Rock Lighthouses are Lighthouses on islands without family quarters. Rock Lighthouses for H & C consist of installations in which all of the facilities are within the Towers.
Reference: H & C 1975, Edwards 1884 (4th term)

SCREW-PILE TOWER/SCREW-PILE LIGHTHOUSE/SCREW-PILE FOUNDATION/SCREW-PILE STRUCTURE/SCREW-PILE SYSTEM. **M.** An older system of piling that did not require the driving of piles. The piles were equipped with special screws that were fastened to the sea or harbor bottom by turning the screw. Most of these units were surmounted by a house with the lantern house and a possible short tower protuding out of the house. Only limited sources include this Aid. USCG 1964 includes it under the heading of Screw-Pile Foundation.
References: Beaver 1973, USCG 1964, Kettle 1896

SEA LIGHTHOUSE. This term refers to the equivalent of a Rock Light.
Reference: Adams 1870

SEA-TOWER. Another term for a Rock Lighthouse.
Reference: Adams 1870

SHORE-BASED LIGHTS. A term appearing in Part J. Possibly influenced by Engelsou. It suggests an overarching term for land-based Lights.
Reference: Part J

SKELETON STEEL TOWER/SKELETON STRUCTURAL TOWER/ SKELETON TOWER/LATTICE STEEL TOWER/STEEL TOWER. **LM.** These are Openwork Structures of steel structural supports that are bolted, welded or riveted together. Square or tapered structures of notable height are common design forms. There are many Minor Lights that are Skeleton Towers though of smaller stature. Some forms are very slender and require support cables.
Reference: Chadwick 1971, Interflash

SKELETON STRUCTURES. **LM.** This term can encompass all structures of a skeleton or open nature; it can also represent undifferentiated structures as described in various lists of lights. A case can be made for seeing it as a subform of overarching terms though it remains in this category.
Reference: Beaver 1953

SKELETON WOODEN TOWER. **L.** This is a relatively rare term for Major

Lights though it is included by USCG 1964. It is probably more common for Minor Lights.
Reference: USCG 1964

STONE FOUNDATION. **M.** A common form of foundation though here it has a specific marine meaning. It is a somewhat rare foundation that has been used in the US Great Lakes. The dwelling and tower are constructed above the Stone Foundation which requires a stable terrain in water. Stone blocks rather than random sized rocks are employed in this construction. The foundation is capable of resisting ice and flowing water pressures.
Reference: USCG 1964

STONE TOWERS/MONOLITHIC STONE TOWERS. **L/T.** A relatively infrequent description for Major Lights. A variety of sources either speak of Masonry Towers or a more specific term such as Granite Towers is employed. USCG 1964 refers to various Towers as having a monolithic character including those of stone.
Reference: USCG 1964

STRUCTURE. **L/M.** A term that is notably vague. Possibly of open dimensions and nondescript or at least not fitting the description of any other form. It is possibly historic.
Reference: Kettle 1896

SUBMERGIBLE LIGHTHOUSE. **M.** Sutton-Jones is the solitary reference for this Aid. Only limited information is provided. It may be more in the form of an idea than a practical and extant Light. The Submergible Lighthouse consists of a base framework of hollow tubes anchored to larger sinkers and supporting a helideck and tower with Light. It is seemingly intended for fairway functions and for approaching shipping terminals.
Reference: Sutton-Jones 1985

TELESCOPIC LIGHTHOUSE. **M.** A modern version of the Caisson that goes beyond it. The Telescopic Lighthouse consists of a caisson with the upper tower and necessary quarters within the caisson. After the caisson is positioned the

remainder of the facility can be pushed into its visible status. The unit is a full unit rather than foundation onto which a dwelling and light can be built. In a second version a module is attached to a telescopic column that comes out of a caisson.
Reference: Naish 1985, Sutton-Jones 1985

WOODEN STRUCTURES. **L.** Hague & Christie 1975 presumably employs this for all structures of wood including Towers; Minor Lights consisting of frame-works of timbers would presumably be included as well. It may conceivably be regarded as a subform of overarching terms.
Reference: Hague & Christie 1975

WOODEN TOWER. **L.** A presumably common form of Tower in past ages with many extant forms. Yet rarely mentioned. Admittedly the shape and color of a tower rather than material of construction is more often included in a listing of lights.
Reference: Kettle 1896

2D Minor Light Forms

2D1 Minor Lights-Single Members

a) Narrower Forms

General Comments. The numerous members of this category are single member structures displaying a vertical stance. In some instances they may support plat-forms or galleries. Often they display Topmarks or Daymarks. The Daybeacon portion of the Database presents an overview of many members of this category sans light apparatus. The category can be subdivided into narrow forms and wider forms. The narrower group consists of three segments: Articulated Beacons, Post/ Pole/Pile, and contributions from Parts C/D.
Classification #: 2240
Operation: The Message system is of a visual form: a relatively small, vertical entity with a low powered light whose messages are increasingly standardized. Daymarks, color pattens and, to some degree, light phase characteristics are often part of the IALA system.

Reference: IALA 1980

ARTICULATED LIGHT/BUOYANT LIGHT BEACON/RESILENT BEACON/ RESINEX BEACON/RESINEX TENSION BEACON. Despite the diverse names this group of Aids at the very least overlap. These aids are similar though probably it cannot be said that they are a single Aid. The basic form consists of a long tube with flotation tank attached to a cable which, in turn, is attached to a mooring block or sinker. It offers the advantage of a Fixed Aid yet it can be installed in areas formerly the exclusive province of Buoys and Lightships. The Aid blurs the boundary between fixed and floating: it floats, has a flotation tank yet it displays a mast and platform and resembles a Fixed Light.
References: Sutton-Jones 1985, USCG 1991, DMA 1995

MAST BEACON/BEACON MAST/MAST. Several forms of Unlighted Beacons are termed Masts (Mast, Sandbank Mast, I-Beam Mast) but seemingly only Kettle has lighted forms of the Mast and further described as a Mast Beacon or Beacon Mast. It may be more of a stout vertical object than a Post or Perch and possibly of greater height.
Reference: Kettle 1896, Parts C/D

PEDESTAL. Term from Parts C/D. Possibly from survey of Light Lists in lst ed
Reference: Parts C/D

POST LIGHT/RIVER-POST LIGHT/STEEL POST LIGHT/POST-LIGHT/IRON POST. Semantics may be as reponsible as technology for the overlapping terms found among Pile, Post, and Pole forms. Older publications are well represented among the sources employing Post while a more contemporary source, Pharos Marine, employs Steel Post. Post Lights have been a staple of numerous US River Lights for many years. Kettle includes the Iron Post which is a Lighted Aid at least in some instances.
References: Holland 1972, Pharos Marine, Putnam 1913, Weiss 1926, Kettle 1896

POLE/POLE LIGHT/SINGLE POLE/POLE BEACON. These are infrequently em-ployed terms. USCG 1964 uses the term Pole for shore sites and the word Pile for comparable marine sites. Pile may represent a more robust entity. Kettle

includes a variety of terms for Minor Lights that other sources seem to restrict to Day-beacons. One of these is Pole Beacon. The lighted form seems to suggest a Pole Light.
References: USCG 1964, Kettle 1896

SINGLE PILE/SINGLE-PILE BEACON/SINGLE PILE LIGHT. First two entities include light apparatus. Pile without the word 'single' may be more common yet that term creates ambiguity: Pile by itself may denote one pile or several. Only a few sources include these terms. That is also true of many Fixed Light terms and especially Minor Lights which arelisted by just a few of the many surveyed sources for this study. Part Iv adds "Light" to basic terms thereby making explicit the character of the Aid.
References: Sutton-Jones 1985, AGA 1948, USCG 1964

PILLAR/METAL PILLAR. This term is from Parts C/D and based on a survey of USNOO/DMA Light Lists. The terms from that survey are not infrequently singular Aids found in a limited number of local operations. Some are easily recognizable though others are more or less a rarity. Pillar suggests a slender object of some height. The qualified term of Metal Pillar is from Kettle.
References: Parts C/D, Kettle 1896

PIPE/PIPE LIGHT. The basic term is also from Parts C/D and the survey of Light Lists. It is presumably a slender object toped by a light apparatus. See comments on Single Pile for second term.
Reference: Parts C/D, DMA

PYLON. Pylon can suggest electrical cable supports. It is also in use for aeronautics by denoting points along a course route (this according to *Webster's Second International Dictionary*). It possibly performed a similar function for Fixed Lights in marine navigation as it is listed in DMA Light Lists.
Reference: Parts C/D, DMA, *Webster's*.

SPAR/SPAR LIGHT. The term Spar is often associated with Buoys and occassionally with Daybeacons. Yet there are Fixed Lights that employ the form as well. It may not be far removed from the Pole/Post/Pile assemblage.

References: Parts C/D, DMA

SPINDLE/SPINDLE LIGHT. The Spindle is more associated with Daybeacons and perhaps is more associated with older Aids that have long continued in use. This is another term from the survey of DMA Light Lists.
References: Parts C/D, DMA

STAFF/IRON STAFF. Seemingly only Kettle includes this term yet it does not appear to be that rare since the support for a Topmark or Daymark is often termed a Staff. For example, Kettle makes mention of Topmarks or Daymarks known as Staff and Globe. Staff as an independent entity is a Lighted Aid and may approximate a Perch or other slender vertical object.
Reference: Kettle 1896

STAKE LIGHT/RIVER STAKE LIGHT. This Aid can be compared to Stake in Daybeacons. It is more often unlighted and only one surveyed source included it, and that a rather elderly one, as a Lighted Aid.
Reference: AGA 1930

b) Wider Forms

General Comments: Remarks for the narrower forms of Unidimensional can apply here as well.
Classification #: 2241
Operation: The remarks for 2240 apply here as well. Though these terms may be more substantial when the message constructs are very similar.

COLUMN. This is presumably an object of moderate circumference that acts as a support for a light apparatus. GRP Beacons are described as Columns in Sutton-Jones. Column appears in Parts C/D as well.
Reference: Sutton-Jones 1985, Parts C/D

CONCRETE BEACON (COLUMN). This may refer to a column-shaped entity though possibly of smaller size. It is possibly a descriptive term rather than a formal name. It is listed in Sutton-Jones in a discussion of River Beacons.

Reference: Sutton-Jones 1985

CYLINDRICAL/CYLINDRICAL ON MARINE FOUNDATIONS/ CYLINDER. Presumably a hollow object with a door and space for equipment. Steel construction seems most likely.
Reference: USCG 1964

GRP BEACON/GRP BEACON TOWER. This refers to an Aid of Glass-Reinforced Plastic (Fiberglass) in a column-shaped form. This form may also find use for Major Lights.
References: Sutton-Jones 1985, Pharos Marine

OBELISKS. From Parts C/D and the survey of USNOO/DMA Light Lists. The object seems more likely a Daybeacon than a Fixed Light yet there are models of the Obelisk with Lights.
References: Parts C/D, DMA

2D2 Multiple-Member Forms

Note: Classification has categories for Open Structures (2242), Enclosed Structures (2243), Composite (2244), and Single Forms (2245). The Database has Multiple-Members which corresponds to Open Structures, and a category for the final three forms. The remarks for Unidimensional Aids can apply here: These Aids have an increasingly standardized message configuration which are influenced by the IALA system, and are often smaller, simpler with less elaborate lighting systems.

BRACED POLE LIGHT. Very similar to Pole save for slender braces. This can probably be regarded as a variant form of the Pole Light.
Reference: USCG 1964

DOLPHIN LIGHT/DOLPHIN BEACON. This is also listed in Daybeacons. Only a few sources include the Light. USCG 1964 speaks of Multiple Piles but not of Dolphin. Yet USCG Light Lists often include the Dolphin. It consists of several piles driven into the river or harbor bottom at an angle and tied together at the top.

It is a specific term for AGA. USCG speaks of a Light on dolphin but not specifically of a Dolphin Light.
References: Pharos Marine, AGA 1948, USCG LL--various editions, Interflash

GUYED TOWER/SEMI-GUYED TOWER. These terms are apparently exclusive with USCG 1964. They consist of a Tower of open steel construction but of very slender proportions and guyed with steel cables. Some Major Lights are similar to this structural form though taller, sturdier, and with more powerful light apparatus. Semi-guyed Light refers to an entity with a very large Daymark that partially supports itself and, in turn, partially supports the Tower.
Reference: USCG 1964

MULTIPLE PILE LIGHT/MULTIPLE PILE. This is a light in USCG 1964 and possibly a few other sources. An accompanying illustration indicates that it has the form of entity known as a Dolphin. Pile Structures can be made of a variety of materials and display a variety of shapes. USCG Light Lists distinguish between Dophins and Pile Structure. The short form is a plausible alternate.
Reference: USCG 1964

PILE STRUCTURES/PILE STRUCTURES ON MARINE FOUNDATION/PILE STRUCTURE LIGHT. These are presumably structures of piling of square or rectangular shape both ashore and on marine foundations. Timbers may also be employed under that heading. The Multiple Pile Light may be closely related to these forms. It is possible to either include or omit "Light" from Aid.
Reference: Parts C/D

SKELETON STRUCTURES. A rather amorphous phrase that can encompass a variety of shapes and sizes of structures of wood, iron, or steel.
Reference: Parts C/D

SKELETON TOWER/SKELETON STEEL TOWER/LATTICE STEEL TOWER/STRUCTURAL TOWER/STRUCTURAL TOWER ON MARINE FOUNDATION. These terms represent an Aid that is also included among Marine Lights and Daybeacons. The various terms refer to an open tower comprised of sections of steel bars that are fastened together. Some forms are square

in shape and of straight construction though others are tapered. Steel Towers on Marine Foundations include caissons, cribs, and other forms found in Major Lights.
References: Pharos Marine, AGA 1948, USCG 1964

TRIPOD/TRIPOD LIGHT/TRIPODAL LIGHT/TRIPOD BEACON/TRIPODAL TOWER/TRIPODAL TOWER LIGHT. These are more common terms for Unlighted Aids. Few of the surveyed sources include Tripod forms in a lighted form. The Aid is three-legged and more likely of iron or steel than wood though wood materials cannot be ruled out. Parts C/D includes the Tripodal from the USNOO/DMA survey. Kettle refers to Tripod Beacon which, in this instance, is a Lighted Aid.
Reference: Beaver 1973, Kettle 1896

TUBULAR STRUCTURES. Again, this is an amorphouse phrasre presumably constructed of piping, tubing, and other hollow extrusions. The term also comes from the above mentioned survey.
Reference: Parts C/D

2D3 Other Forms: Enclosed/Composite/Single Structures

APPARENT LIGHT. A 19th century system employed in England in which a second light in a Lighthouse tower was focussed on a mirror attached to a nearby Unlighted Beacon. The reflected light gave an impression of an actual light or an Apparent Light.
Reference: UK 1861

ARM. Presumably a horizontal support piece for supporting a Light and attached to a building, pier or other object not part of an Aid to Navigation structure.
Reference: Parts C/D

CAIRN. This Aid is a major element for Daybeacons but less so for Fixed Lights yet the Parts C/D study located Cairn Lights in USNOO/DMA Light Lists.
References: Parts C/D, USNOO/DMA

DISC BEACON. There is a single reference to this Aid. Kettle lists this form as in use in Portugal. Details are lacking. It may possibly suggest a support with a spherical Daymark and light.
Reference: Kettle 1896

FANAL. A historical entry. It is a French term for a Harbor Light.
Reference: Naish 1985

HOUSE/HUT ON STRUCTURE/HUT ON PILE STRUCTURE/HUT ON TRIPOD. Terms from classifications and underlying structures in Parts C/D.
References: Parts C/D

HUT. This term is from the Parts C/D survey. It is seemingly restricted to Australia. Very possibly akin to a Small House.
Reference: Parts C/D

IRON FRAME/TRIANGULAR FRAME/WOODEN FRAME/FRAMEWORK. Historic terms in all likelihood. Both apper in Kettle and refer to The Netherlands. They may refer to simple, undistinguished structures.
Reference: Kettle 1896

IRON TURRET. A single reference in Kettle 1896 for the Netherlands for this term. Details are lacking.
Reference: Kettle 1896

LEVER LIGHT/SWAPE LIGHT/POPINJAY. These are historical entries from early modern European times if not before. A lantern is attached to a long pole or rod and attached to a fulcrum for raising and lowering.
Reference: Naish 1985

LIGHTED BANK. This term comes from Parts C/D and the French Service Techniques des Phares et Balises. This Aid consists of multiple lights set in a metal railing bearing some resemblance to a US TCD guard railing.
References: Parts C/D, STPB

PYRAMID/STONE PYRAMID/PYRAMID BEACON/PYRAMIDAL. This suggests more of a Daybeacon entity though it is employed as a support for some Lights according to the oft mentioned study from Parts C/D. Kettle offers two variants terms. One with the material of construction in the title, and the other with Beacon added to Pyramid.
References: Parts C/D, STPB, Kettle 1896

SMALL HOUSE/SMALL HOUSE ON MARINE FOUNDATIONS. House in this sense refers to small or tiny buildings supporting a Light and enclosing necessary equipment. It may no longer be a standard form.
Reference: USCG 1964

STAND/IRON STAND. A Term from Parts C/D. It is of uncertain meaning. Possibly the stand is a wooden platform or base for supporting a Light apparatus but without more elaborate support structures. Kettle includes the material of construction for one form of Stand.
References: Parts C/D, Kettle 1896

TRIANGLE BEACON. A rare term with a possible reference in Kettle. Materials of construction and rationale for this form are not known. It may suggest a Daybeacon but this specific entity is lighted.
Reference: Kettle 1896

2E Morphological & Adjunct Terms

2E1 Major Lights

COAST LIGHT/COAST STATION. These terms from Johnson designate Lights of a major form in coastal areas. These terms and many others designate coastal situations that have both physical and morphological meanings. The morphological meanings may have the greater significance.
Reference: Johnson 1890

COASTAL LIGHT/COASTAL BEACON LIGHT/LIGHTED COASTAL BEACON/COAST BEACON/COASTAL BEACON (LIGHTED)/COASTAL NAVIGATIONAL AID. Coastal Light has two possible meanings: a more precise one denoting Major Lights found on a headland or a less precise one serving as a generic title for any Major Light on the coast. USCG speaks of Seacoast Lights and that may be the equivalent of Coastal Light. Coastal Light may well overlap with the categories of morphology and physical lights (Major Lights). The remaining terms are informal variants from Langmaid that approximate the meaning of Coast Light.
References: Beaver 1975, USCG 1964, Langmaid 1966

COASTAL TOWER. Seemingly a general overarching term though Bathurst's specific reference is to an early Light with an open fire. She employs Major Light for more modern and enclosed structures.
Reference: Bathurst 1999

COASTING LIGHT. A term appearing in one source which refers to Lights aiding navigation along a coast. It overlaps with Coastal, Secondary and probably Headland Lights terminology.
Reference: Kerchove 1961

COASTWISE BEACONS/COASTWISE BEACON LIGHT/COASTWISE GUIDING LIGHTS/COASTWISE LIGHTS. Further terms from Langmaid that are apparently similar in meaning to terms beginning with the word Coastal.
Reference: Langmaid 1966

FEU DE JALONNEMENT. A French term for Coastal Markings that are lighted. English language forms include Coastal Marks/Coastal Aids but the French form has a definitely lighted character. It marks long coastal areas that lack significant landmarks.
Reference: IALA 1970

FIRST CLASS LIGHT/FIRST-CLASS DIOPTRIC LIGHT/FIRST-ORDER DIOPTRIC LIGHTHOUSE/FIRST-ORDER LIGHT-HOUSE/LIGHTS OF THE FIRST-ORDER/-2ND, -3RD, -4TH, -5TH, -6TH. Classical Lighthouse and Harbor Light lighting apparatus is divided into as many as nine classes (Hyper-radial, Meso-radial, 1st, 2nd, 3rd, 3.5, 4th, 5th, 6th with Hyper at 1330 mm and 6th at 150 mm). These classes refer to lens and various acccoutrements. It is possible to correlate physical structure, location, and function with the light apparatus to some degree. That process is not taken up by the Database. A few sources alter the lighting apparatus into a type of morphological term. Corbin refers not only to an apparatus that is of the First Order but also a First-class light. UK 1861 appears to be the most prominent source for altering classes or orders of mechanism into types of light. Most of these terms stem from that source. UK 1861 also includes a Fourth Class-Light which corresponds to Lights of the 4th Order.
References: Corbin 1926, UK 1861

GUIDANCE LIGHT/GUIDING LIGHT/GUIDE LIGHT. Additional terms from Langmaid with the meaning of Lighthouses in coastal locations. See Also Coastal and Coastwise terms. Kettle's Guide Light may have a more restricted meaning and role.
Reference: Langmaid 1966, Kettle 1896

HAZARD LIGHT. A rarely mentioned term. Whitney notes that the Rock Light-house has a dual character: as a Landfall Light and Hazard Light. This contrasts markedly with many sources that speak of Landfall Lights without a multiple role. Hazard Light may suggest Hazard Beacon which is a relatively common term in Aeronautical Navigation Aids.
Reference: Whitney 1975

HEADLAND LIGHT/HEAD LIGHT. These Lights constitute the primary aids save for Landfall Lights. Presumably many of these are land-based. Coastal Lights for Beaver 1973 has the same meaning. Coasting Light (Kerchove) denoting points of navigation interest when navigating along a coast may have a similar meaning. Headland Light is a component as well of Primary Seacoast Light and Seacoast Light. UK 1861 provides an alternate with Head Light.
References: Kerchove 1961, Naish 1985, Beaver 1973, UK 1861

LANDFALL LIGHT. Only a few sources include this as an actual term; those that including the term indicate that this form of Light is found on the outermost ram-parts of the coast and often on rocks. Whitney seems to alter the meaning by noting many Landfall Lights are on headlands, and that Rock Lights are frequent-ly Hazard and Landfall Lights together. There are no hard and fast boundaries for Major Lights based on function. Both perceptions may have validity.
References: Whitney 1975

MAIN LIGHT. A term that both encompasses Landfall Lights and Hazard Lights. Fewer sources speak of Hazard Lights; possibly Landfall Light is seen as cover-ing the spectrum of possible functions. Only a few sources mention Landfall Lights, fewer include Hazard Lights and only rare sources include Main Light.
References: Beaver 1973

MAJOR COASTWISE LIGHT. Does this constitute an actual term or is it a general descriptive phrase? Bowen applies it to Lights otherwise termed Headland Lights.
Reference: Bowen 1947

MAKING LIGHT. An alternative to Landfall Light. Making Lights are the first Lights sighted when approaching from the open sea.
Reference: Kerchove 1961

OBSTRUCTION LIGHT. A possibly questionable entry since USNOO inclusion of it may refer to Aero Navigation Lights rather than Marine forms. The term may also represent an equivalent of Hazard Light.

Reference: USNOO 1969

WARNING LIGHT/WARNING BEACON LIGHT. A somewhat amorphous term which suggests Major Lights that denote hazards on rocks or headlands as well as other dangers. The term can also include Buoys and Minor Lights. The second term is contributed by Langmaid and seemingly has a similar meaning.
Reference: Kerchove 1961, Langmaid 1966

2E2 Minor Lights

BAR BEACON. This term has a single source in Kettle 1896. The Aid assists mariners entering a body of water and is possibly a form of Leading/Range Lights or at least is affiliated with that form of Aid.
Reference: Kettle 1896

BRIDGE LIGHT/BRIDGE NAVIGATION LIGHT. A term denoting Lights marking piers, supports and movable portions of bridges. These Lights are often regulated by local agencies and not by the primary marine Aids to Navigation department. Only a few of the referenced sources specifically mention this Light.
References: USCG 1977, Automatic Power

CHANNEL LIGHT/CHANNEL MARKERS/CHANNEL NAVIGATION LIGHT. This term and variant forms are so commonplace that they are virtually an Overarching term. This is quite possibly the most common function for Minor Lights. Marking of channels is an ancient practice and a prominent feature of Daybeacons as well. IALA includes Buoys within the designation of Channel Light though it would appear that Channel Light can implicitly mean a Fixed Light. See also Feu de Rive for the French Aid that is of a fixed nature.
Reference: USNOO 1969, Putnam 1933, IALA 1970

DIRECTION LIGHT/DIRECTIONAL LIGHT/DIRECTION BEACON. These terms refer to Light(s) that are narrowly focussed and that delineate a narrow channel. Kettle includes Direction Beacon which is possibly a similar Aid or an earlier version.
References: DMA 1995, IALA 1970, Kettle 1896

DOCK LIGHT. A single source includes this term. It may represent a variant form of Pier Light. The light in question is of low intensity and restricted in use.
Reference: McDermott Light & Signal

FISHING LIGHT/FISHING-LIGHT. An Occasional and Private Aid that is lighted as required.
Reference: DMA 1995, Kettle 1896

FEU DE RIVE. French term for Fixed Lights that mark channels. Channel Lights, by contrast, can be fixed or floating.
Reference: IALA 1970

FOG DETECTOR LIGHT. This Light is a second unit at some Lighthouses with the purpose of detecting fog. The Aid displays an intense bluish-white light that illuminates the fog area.
Reference: USNOO 1969, DMA 1983

ISOLATED DANGER BEACON. A Lighted Beacon that is an integral part of the Lateral System of Buoyage. Topmarks as well as the colors and patterns of the Beacon define its function and physical appearance.
Reference: Sutton-Jones 1985

JETTY END LIGHT. A single source includes this term and it may be akin to Pier and Dock Light forms.
Reference: Pharos Marine

LEADING LIGHT. An alternate name for Range Lights; UK favors Leading Light.
Reference: Naish 1985, Sutton-Jones 1985, IALA 1970

MARINE TRAFFIC LIGHT. Pharos Marine sees this as a Traffic Signal in a high-intensity form that can be seen during the day. It could be subsumed under Traffic Signal though its character is notably different.
Reference: Pharos Marine

PIER LIGHT/PIERHEAD LIGHT/PIER-BEACON. A nearly self-explanatory term. Dock and Jetty Lights are similar entities.
Reference: Perkin Marine Lamps, Bowen 1947

PORT LIGHT. Kerchove employs this term for Lights at pier-heads or harbor entrances.
References: Kerchove 1961

RANGE LIGHTS/RANGE BEACON/ELECTRIC RANGE LIGHT. Two or more lights in alignment which create a leading line or range denoting the center-line of the channel. Range Beacon employed by Johnson but with the meaning of a Lighted Range Aid.
Reference: DMA 1995, USNOO 1969, Kerchove 1961, Johnson 1890, Strobridge 1974

SECTOR LIGHT/LIGHT SECTOR/SECTORED LIGHT/SECTOR NAVIGATION LIGHT/PORT ENTRY SECTOR LIGHT. This form of Light includes two or more colors with at least one color performing a specific function such as denoting a specific hazard. Port Entry Sector Light suggests an Aid that is akin to a Direction Light.
References: IALA 1970, Pharos Marine, Naish 1985

SINGLE STATION RANGE LIGHT. IALA interprets this term as of US provenance and an alternate to Direction Light.
Reference: IALA 1970

SINGLE STATION LEADING LIGHT/SINGLE STATION DIRECTION LIGHT. This can possibly be seen as a Direction Light or Single Station Range Light. Single Station Direction Light is the term Naish employs for the Single Station Leading Light of Pharos Marine.
Reference: Pharos Marine, Naish 1985

TIDE LIGHT/TIDE-LIGHT/TIDAL LIGHT/TIDE SIGNAL. These Lights denote tidal conditions for a given harbor or bay. This form of Aid looms up large

for UK 1861. That may indicate a larger role for Tidal Lights in that time. UK 1861 refers to Tide-Lights and Signals which may suggest a separate day Aid or two segments: one lighted, one unlighted.
Reference: UK 1861

TRAFFIC SIGNALS/PORT TRAFFIC SIGNALS. A very broad range of Indicators are represented by this Light including traffic regulations, docking, bridge and other functions affecting the movement of ships in harbor areas.
Reference: Kerchove 1961

2E3 Character of Operation Forms

a) Form of Operation:

General Comments: This plethora of terms has closely related functions, and individual descriptions can be omitted. The terms Attended, "Manned", Watched, all refer to direct and immediate human operations of a Light. Nonattended and Unattended, "Unmanned", and Unwatched all refer to Lights without that immediate presence. Semi-watched, employed by one source, refers to occasional human involvement though how that differs from automatic operation with infrequent human involvement is not clear.

ATTENDED LIGHT/NONATTENDED LIGHT/UNATTENDED LIGHT
AUTOMATIC LIGHT/AUTOMATED LIGHT
"MANNED" LIGHT/"UNMANNED" LIGHT/"MANNED" LIGHTHOUSE
ROBOT LIGHT
SEMI-WATCHED LIGHT
WATCHED LIGHT/UNWATCHED LIGHT/UNWATCHED NAVIGATION LIGHT
References: McCormick 1936, Conway 1915, IALA 1970, Kerchove 1961, USNOO 1969, Beaver 1973, Leffingwell & Welty 2000

b) Form of Nature of Light Operation

AUXILIARY LIGHT. A Fixed Light with at least two light assemblies. The less

significant -- when different functions are performed -- becomes known as the Auxiliary Light.
Reference: DMA 1995

EMERGENCY LIGHT. A light that is activated when the Main Light and standby units fail. An Emergency Light may be of reduced power.
Reference: IALA 1970

MAIN LIGHT. The more significant of two (or more) Lights sharing the same support or otherwise in close proximity.
Reference: IALA 1970

OCCASIONAL LIGHT. Term for Lights that are exhibited when required but not on a regular basis. DMA 1995 specifies three forms: Tidal Light, Fishing List, and Private Light. The first two are in the morphology category. Some Private Lights operate on a regular basis as seen in USCG Light Lists.
Reference: DMA 1995, USNOO 1969

PERMANENT LIGHT. IALA term for Lights in service. Presumably this is in contrast with Emergency, Seasonal and other Lights.
Reference: IALA 1970

SEASONAL LIGHT. A light exhibited during the navigation season (or a segment of the season).
Reference: DMA 1995

STANDBY LIGHT. A reserve Light assembly near a Fixed Light installation that serves as a backup if the Main Light fails.
Reference: IALA 1970

SUBSIDIARY LIGHT. A Light situated near the principal light of a Fixed Light (known as a Main Light with a special purpose). The meaning of Auxiliary Light suggests a resemblance to the Subsidiary Light as described in DMA 1995.
References: IALA 1970, DMA 1995

TEMPORARY LIGHT. A short-term unit in use during repair work on the permanent installation.
Reference: IALA 1970

VERTICAL LIGHT. Two Lights (or more) positioned vertically that display different appearances. If such Lights have functions of different levels of significance then the lesser Light is termed an Auxiliary Light. DMA lists the light as a Vertical yet DMA notes the light can be horizontal or follow a geometric pattern.
Reference: USNOO 1969

WEAK LIGHT. A Light of low power that cannot be seen beyond its luminous range even in clear weather. This Light can be seen to the limits of the geographic range.
Reference: USNOO 1969

WINTER LIGHT. A US term. It refers to a Light employed during the winter in place of the regular Light. The Winter Light is not as strong in intensity but has the same Light Phase Characteristic.
Reference: IALA 1970

2E4 Miscellaney

AEROMARINE LIGHTS. Lights of a marine nature so arranged that they can be used by aviators.
Reference: DMA 1995

AERONAUTICAL LIGHTS. Aero lights near coastal areas that are visible to marine navigators. They are often listed in Light List publications.
Reference: DMA 1995

CHAPEL LIGHTHOUSE. An archaic form described in H & C 1975 that consists of a chapel with provision for a lantern on the roof. The specific reference is to the chapel of St. Nicholas, Ilfracombe. It is possibly still in use.
Reference: H & C 1975

COTTAGE-LIGHTHOUSE. An archaic form described in H & C. These lights consisted of a cottage with a small open fire pit on the roof.
Reference: Hague & Christie 1975

FIRE BEACON/FIRE TOWER. Terms for ancient Lighthouses with an open fire at the top. Reference: Naish 1985, Hague & Christie 1975

FIRST CLASS LIGHT. Corbin 1926 employs the First Order term in such a manner that it becomes the name of a type of Light and not merely a description for a classical lens apparatus.
Reference: Corbin 1926

HIGH & LOW LIGHTS. A reference to Light Stations with two separate Light units. The terms refer to the taller and shorter towers respectively.
References: UK 1861, Kettle 1896

LAMP-POST. The term Oceanic Lamp-Post is included with Curious Terms in an attachment to Overarching Terms. Lamp-Post in this instance is an actual Aid. It is possibly historic since it seemingly appears only in Kettle.
Reference: Kettle 1896

LANTERN LIGHT. Term may suggest a Light that consists of little more than a light apparatus or possibly it suggests an atypical form of light apparatus.
Reference: Kettle 1896

LIGHTHOUSE-ORNEE. Lighthouse-adorned seems to be the meaning of the term. OED notes that "Ornee" is erroneous; that one "e" not "ee" is correct. Nonetheless, H & C has a double "e". H & C applies the term to a Lighthouse at Oban in Scotland which is complete with lawns and border plants. It is an example of what H & C terms "Whimsical Lights."
References: Hague & Christie 1975, OED 1933 Vol VII, 207

MAJOR HARBOUR LIGHTHOUSE/MINOR COASTAL LIGHT. Whitney in describing the orders of Fresnel lenses coined these terms by noting that 3rd

Order Lenses were employed for Major Harbor and Minor Coastal Lights.
Residence: Whitney 1975

PRIVATE LIGHTS. A Light privately owned and operated. DMA regards such Lights as Occasional Lights though examples of each in regular are abundant in USCG and other lights lists.
Reference: DMA 1975

STANDING BEACON. This term, appearing in Kettle, is perhaps obscure. It may refer to Beacons standing or fixed as opposed to floating Beacons.
Reference: Kettle 1896

TURRET. Kettle includes mention of Turret as a foundation for Lights several times in France. Possibly this is due to a surfeit of castle turrets in coastal France or possibly this is a regular form of support. It is probably a historic reference only.
Reference: Kettle 1896

Chapter 2F The Physical Light in the Form of Light Energy Emission Configurations: Light Phase Characteristics

Prefatory Note: The various forms of Light Phase Characteristics undergo many permutations in the sources that take up this topic. Identical or nearly identical chacteristics may appear different because of rules of capitalization or because of dropping/adding key words. Nonetheless, an attempt has been made to include the various differences though not all may have be recorded. The greater portion of the sources capitalize the first word only (e.g., Group Flashing Light) but some sources capitalize all words and a rare source capitalizes none. Some sources see characteristics as a dimension of the light apparatus and emission but others add the word "light" to the characteristic thereby adding to the sense of the emitted characteristics as a physical entity. This is especially notable in OED in which light can mean the lamp of a Lighthouse including the "prefixed qualifications" such as a flashing or occulting characteristic.
Reference: OED 1933, Vol. VI, L-M

AZIMUTH CONDENSING LIGHT. This is a historic term from Kettle. It is a form of Holophotal apparatus of a narrow focus for use in channels. It was possibly an early form of Directional Light or Single-Station Range or Leading Light; see those entries in the Morphology segment.
Reference: Kettle 1896

BRIGHT. UK 1861 includes numerous references to the color White. Kettle 1896 does not include White at all. Instead the word Bright seemingly replaces White. Both introductory essays and the light list portion of that work refer to Bright. Explanation is seemingly lacking for the use of Bright.
Reference: Kettle 1896

CATADIOPTRIC LIGHT/CATADIOPTRIC SYSTEM/CATADIOPTRIC APPARATUS. Term supplied by Wryde 1913 and other early sources. It may be an element of a Catoptric system rather than a free standing unit. It consists of rings or zones that capture otherwise lost light rays. UK 1861 supplies a variant form through the use of System not Light. Kettle adds Apparatus.
Reference: Wryde 1913, UK 1861, Kettle 1896

CATOPTRIC LIGHT/REFLECTOR SYSTEM. A concentrated beam of light created by reflectors; see also Dioptric Light. Kettle 1896 speaks of Catoptric or Reflector System.
Reference: USNOO 1969, Wryde 1913, Kettle 1896

COLORED LIGHT. USNOO defines this term as a light other than white.
Reference: USNOO 1969

DIOPTRIC LIGHT/DIOPTRIC SYSTEM/LENS SYSTEM. A concentrated light beam created by refracting lens. See also Catoptric Light which employs reflecting lenses. UK 1861 offers System instead of Light in this context. Kettle 1896 employs Dioptric as interchangeable with Lens System. Kettle's terminology is at variance with other sources including elderly sources but he offers the advantage of clearly denoting the forms of apparatus.

Reference: USNOO 1969, UK 1861

DIOPTRIC HOLOPHOTAL LIGHT. Bathurst employs this term for the lens develop-ments of Thomas Stevenson in the 19th century. It may provide a fuller and more accurate title for the apparatus.
Reference: Bathurst 1999

HOLOPHOTAL APPARATUS/HOLOPHOTAL SYSTEM. This may not constitute a independent means of projecting beams of light energy. Instead it may be a system for capturing light beams that would otherwise be lost. Kettle 1896 refers to it as a system.
Reference: Kettle 1896

INTERMITTING LIGHT. This may not be a reference to the Light Phase Characteristic known as an Intermittent characteristic. Instead it may constitute an early term for a Flashing Light. It is included in Kettle who notes this system employs an light eclipse device thereby presenting an image different from the Revolving form.
Reference: Kettle 1896

LENTICULAR LIGHTHOUSE/LENTICULAR FRENCH SYSTEM/ LENTICULAR APPARATUS. UK 1861 offers many concepts and terms that are subsequently rare if not obscure. Kettle 1896 offers elcuidation here. Lenti-cular Lighthouse or Lenticular French System or Lenticular Apparatus refers to a Lighthouse with a lens (more often termed Fresnel Lens) as opposed to reflector system. OED notes Lenticular comes from the word Lentil because of the resemblance of a Fresnel lens panels to the shape of the lentil. Kettle speaks of lst order Lenticular apparatus instead of the more common lst order light apparatus. Inclusion of the intensity of the lamp apparatus rather than the physical type of apparatus is the more contemporary practice for listing of Lights rather than the physical apparatus.
Reference: UK 1861, Kettle 1896, OED 1933, Vol VI, 201-202

RECIPROCATING LIGHT. This is admittedly an obscure matter mentioned by one correspondent to a survey in UK 1861. The light in question may be related to

Revolving Lights but employs "crossed prisms" rather than conventional lenses. The reciprocating approach was in actual use.
Reference: UK 1861

REVOLVING LIGHT. An alternate name for Rotating Light.
Reference: USNOO 1969

RHYTHMIC LIGHT. A Light displaying a regular pattern of light emissions and eclipses includes all lights save Fixed Lights. This is from IALA nomenclature discussed in USCG 1964.
References: DMA 1995, USCG 1964

ROTATING LIGHT/ROTATING BEACON. Term refers to light beams displayed through an apparatus that rotates the light producing facility. Revolving Light is an alternate name.
Reference: USNOO 1969

RUBY. References to this color are found in UK 1861. Ruby, according to OED, is a dark red tinged with purple. Ruby glass is colored through the use of various kinds of metal oxides. Ruby is a hue of red rather than simply interchangeable with red.
Reference: UK 1861

UNDULATING LIGHT. The term is included in USNOO 1969. It is primarily an Aero Light and very much like the Fixed and Flashing characteristic of maritime navigation.
Reference: USNOO 1969

2F2 Specific Light Phase Characteristics

a) FIXED LIGHT/FIXED:

Characteristic: A light emission that is constant (or continuous) and steady.
Comments: Fixed Light in US and UK parlance can refer to the physical structure and light apparatus which is fixed in position. Here Fixed Light refers to a light

phase characteristic. The literature is divided on the practice of including the word "light" in the phase title. Fixed Light is employed by a minority of the sources though that minority includes IALA 1970.
References: IALA 1970, USNOO 1969

b) FIXED & FLASHING LIGHT/FIXED & FLASHING:

Characteristic: A fixed light interspersed with periodic flashes of greater intensity.
Comments: A relatively common characteristic yet IALA 1970 omits it. However, Pharos Marine includes the term in a listing of IALA characteristics. Some sources speak of two lights in combination: a Fixed Light and a stronger Flashing light.
References: IALA 1970, Pharos Marine, USNOO 1969

FIXED & GROUP FLASHING/FIXED & GROUP FLASHING LIGHT:

Characteristic: Similar to the Fixed and Flashing (FFL) characteristic except that the periodic flashes are in groups. Fewer sources include this alternate version of the FFL. It is possibly declining in use.
Reference: Dunlap 1972, USCG LL PC 1962, USCG LL PC 1991

c) FLASHING/FLASHING LIGHT

Characteristic: The length of emissions of light are distinctly less than accompanying lengths of darkness. Emissions of light are of equal length.
Comments: Older source often reserved Flashing and Flashing Light for single flashes but IALA 1970 and older USCG light lists employ the term as an over-arching term within which specific forms of flashing lights are situated. IALA does note that it is a common practice to employ Flashing light to mean a single flashing light. See also Single-flashing.
References: IALA 1970, USCG 1964, USCG LL PC 1962

SINGLE-FLASHING/SINGLE-FLASHING LIGHT:

Characteristic: Emissions of lights are in a single pattern and a pattern that is

regular.
Comments: DMA indicates a rate less than 50 flashes per minute while USCG indicates a maximum rate of 30 flashes per minute.
References: DMA 1995, USCG LL PC 1991, Pharos Marine

GROUP FLASHING/GROUP-FLASHING/GROUP FLASHING LIGHT/ GROUP-FLASHING LIGHT:

Characteristic Light emissions are in groups (in specific amounts) and repeated at regular intervals
Comments: Group flashing without hyphen is more common in the literature. Langton speaks of a Quintuple Group Flashing characteristic as if it was an actual type of characteristic rather than a specific application of a standard characteristic which is the practice of other sources.
References: IALA 1970, DMA 1995, Langton 1944

COMPOSITE GROUP FLASHING/COMPOSITE-GROUP FLASHING/ COMPOSITE GROUP-FLASHING LIGHT:

Characteristic: Similar in emissions to Group Flashing (Gp F) except that the groups differ in the number of flashes.
Comments: Less common in the literature than simple Gp F but it is more often present in newer sources.
References: USCG 1991, DMA 1995

SHORT FLASHING LIGHT/SHORT-FLASHING LIGHT:

Characteristic: A Light with emissions under two seconds in duration. Emissions can be precisely 0.7 seconds
Comments: This characteristic is included by two sources among those surveyed. USNOO 1969 includes it and states the flashes are less than two seconds. USCG 1964 lists it as one of the new IALA phase characteristics with flashes less than two seconds with a preferable 0.7 second flash. This characteristic is not listed by Pharos Marine which thereby provides details on IALA practices.
References: USNOO 1969, USCG 1954

LONG FLASHING/LONG-FLASHING/LONG FLASHING LIGHT/LONG-FLASHING LIGHT:

Characteristic: Emissions are two seconds or more in duration and displays a single-flashing character.
Comments: There are seemingly two forms of this characteristic. Kerchove mentions a Long Flashing Light with German and French forms. But that is seemingly separate from, though perhaps similar, to the IALA introduced Long-flashing characteristic in 1960; that is subsequently mentioned in several additional sources. Kerchove speaks of a long flash but it lacks the precision of the later definition.
References: DMA 1983, Kerchove 1961, USCG 1964

SHORT-LONG FLASHING/SHORT-LONG FLASHING LIGHT:

Characteristics: This light phase characteristic displays an approximate .4 second flash and 1.6 second eclipse. The period shows 6-8 times a minute.
Comment: USNOO 1969, Weems 1940 and older USCG light lists included this characteristic but it seems absent from other sources. Possibly it was dropped because of the similarity in appearance to the Morse Code characteristic introduced by IALA in 1960.
References: USNOO 1969, Weems 1940, USCG Light Lists

MORSE CODE/MORSE CODE LIGHT:

Characteristic: A characteristic in which flashes are arranged so as to create a Morse code character (dot-dash appearance).
Comment: This was included in the nomenclature of IALA in 1960; a variety of sources now include it. It may have led to the demise of the Short-Long characteristic.
References: USCG 1964, DMA 1995

BLINK & BLITZ:

Characteristics: Blink emissions are a minimum of two seconds while those of Blitz are a maximum of one second; relatively lengthly eclipse accompany the flashes.
Comment: IALA 1970 notes that Germany -- among other nations -- classifies short emissions by duration of flashes positioned between two periods of darkness. They are listed under the heading of "Appearance of Light" though other standard characteristics speak of duration of emissions as well. Both constitute flashes. See also: Schien
Reference: IALA 1970

d) Isophase Characteristics

ISOPHASE LIGHT/ISOPHASE/EQUAL-INTERVAL/EQUAL-INTERVAL LIGHT/EQUAL INTERVAL LIGHT:

Characteristic: Emissions of light are equal in duration to eclipses of darkness.
Comments: Isophase and Equal-Interval have the same meaning. Isophase has seemingly increased in usage while Equal-Interval has decreased in use. USCG 1964 lists Equal-Interval Light as one of the new IALA terms. However, IALA 1970 lists both terms with Isophase as preferred to Equal-Interval. An older definition of Occulting included Lights whose period of light was equal or greater than the period of darkness. But the equal light/dark version is now a separate characteristic.
References: IALA 1970, USCG 1964, Wryde 1913, Dutton 1958

INTERMITTENT LIGHT:

Characteristic: Emissions of light are of the same duration as the eclipses of darkness.
Comments: Only a few surveyed sources incude this term. Intermittent appears to be an older term indicating equal amounts of light and dark in a light apparatus emission. USNOO 1969 employs the term with the meaning of Interrupted Quick Flashing Light. USNOO includes the term as a pointer to lights other than equal interval: flashing, occulting and fixed in form.
References: Kerchove 1961, USNOO 1969

SCHEIN:

Characteristic: Emissions occur between eclipses which are very often of the same duration.
Comments: This term, along with Blink and Blitz, are terms listed under the "Appearance of Light" category in IALA 1970. These terms refer to duration of emissions of lights. Schien would appear to constitute an Isophase characteristic or very nearly so.
Reference: IALA 1970

e) OCCULTING/OCCULTING LIGHT:

Characteristic: In contrast to flashing, these emissions of light are longer in duration than accompanying units of darkness and eclipses are of equal length. An alternate explanation could state that Occulting lights are steady and constant with emissions of light interspersed by eclipses of darkness.
Comments: Older sources often employ the simple Occulting term for single occulting characteristics but IALA employs it as an overarching term. IALA, however, notes that it is a common practice to use the term to designate single occulting messages. USCG now also employs Occulting as an overarching term.
References: IALA 1970, USCG LL PC 1991

SINGLE OCCULTING/SINGLE-OCCULTING/SINGLE-OCCULTING LIGHT:

Characteristic: The unit of emissions of lights are longer in duration than the accompanying eclipses.
Comments: This is a relatively new term and substantially replaces the use of Single-Occulting characteristics. Occulting is now an overarching term for all forms of Occulting.
References: Pharos Marine, USCG LL PC 1991

GROUP-OCCULTING/GROUP OCCULTING/GROUP OCCULTING LIGHT/ GROUP-OCCULTING LIGHT:

Characteristic: Occulting emissions in this characteristic are in groups and replicated in a regular pattern.
Comments: Group Occulting refers to multiple emissions and is now balanced by Single Occulting for single emissions; both are within the Group Occulting characteristic.
References: Dunlap 1972, Bowditch 1984

COMPOSITE GROUP OCCULTING/COMPOSITE GROUP-OCCULTING/ COMPOSITE GROUP-OCCULTING LIGHT:

Characteristic: This is also a Group Occulting characteristic; however, in this form the groups of occulations vary in numbers of emissions.
Comments: This is a relatively new characteristic unless the older Group Occulting form contained both regular and irregular groups of emissions.
References: DMA 1995, Dunlap 1972

f) Quick, Very Quick, & Ultra Quick Characteristics:

I. Quick Section

QUICK/QUICK LIGHT/QUICK FLASHING LIGHT/QUICK-FLASHING LIGHT/QUICK FLASHING/CONTINUOUS/CONTINUOUS QUICK LIGHT/ CONTINUOUS QUICK:

Characteristics: Emissions are repeated regularly and rapidly; often at a rate of 60 per minute.
Comment: A relatively new term but already a characteristic that offers many different permutations of terminology. USCG 1991 notes that Quick replaces Quick flashing light. And most other recent sources also omit the word flashing from rapid characteristics. Quick or Quick Light can refer to regular patterns of quick characteristics though USCG 1991 and IALA via Pharos reserve Quick as an overarching term and instead refers to Continuous Quick for the regular phase. Continuous is also applied to Quick, Very Quick and Ultra Quick forms but not to slower phases.
Reference: USCG LL PC 1991, Pharos Marine

GROUP QUICK LIGHT/GROUP QUICK FLASH/GROUP QUICK FLASHING:

Characteristic: Emissions for these chararacteristics consist of groups of rapid flashes emitted at regular intervals. DMA notes that the flash rate is 50-80 per minute.
Comments: Among surveyed sources only a few included this characteristic although they tend to be newer sources.
References: DMA 1995, Pharos Marine

GROUP QUICK WITH LONG-FLASHES

Comments: This characteristic follows a pattern of Group Quick interrupted at regular intervals with a Long Flash (at least two seconds in length).
Reference: DMA 1995

INTERRUPTED QUICK/INTERRUPTED QUICK FLASHING/ INTERRUPTED QUICK LIGHT/INTERRUPTED QUICK FLASHING LIGHT/ INTERRUPTED QUICK-FLASHING LIGHT:

Characteristic: Lengthly eclipses between rapid flashes creates this characteristic.
Comments: At least five forms of this characteristic are in use with Interrupted Quick Flashing the most frequently employed. USNOO 1969 offers a different perspective for this characteristic: Interrupted Quick Flashing Light is an over-arching term with three forms: 1) Group Interrupted Quick Flashing Light in which dark segments are of longer duration than the units of lights; 2) Intermittent Quick Flashing Light wherein darkness and light are equal; 3) Occulting Quick Flashing Light in which the flashes are of greater duration than the eclipses.
References: Admiralty 1952, USNOO 1969, Dunlap 1972

GROUP INTERRUPTED QUICK FLASHING/GROUP INTERRUPTED QUICK FLASHING LIGHT/GROUP INTERRUPTED QUICK FLASHING:

Characteristic: This characteristic has groups of rapid flashes separated by eclipses of greater duration.
Comments: Only two surveyed sources include this characteristic: Admiraltiy 1952 and USNOO 1969. The description is from Admiralty 1952. USNOO's description may be at variance, or at least stated differently, from that of the Admiralty.
Reference: Admiralty 1952, USNOO 1969

INTERMITTENT QUICK FLASHING LIGHT:

Characteristic: Quick flashes are interspersed with eclipses of the same length.
Comments: Kerchove 1961 and USNOO 1969 are the only surveyed sources to include this characteristic. See also Interrupted Quick Flashing, Group Interrupted Quick Flashing, and Intermittent Light.
References: Kerchove 1961, USNOO 1969

OCCULTING QUICK FLASHING LIGHT:

Characteristic: Emissions of light are interspersed with eclipses of shorter duration.
Comments: This entity is found only in Kerchove 1961 and USNOO 1969. USNOO sees it as one of three forms of the Interrupted Quick Flashing Light.
References: Kerchove 1961, USNOO 1969

QUICK FLASHING LIGHT WITH BLINKS:

Characteristics: This characteristic resembles Group Interrupted Quick Flashing since eclipses are of greater duration than the flashes.
Comments: This term is seemingly listed only in Kerchove 1961.
Reference: Kerchove 1961

II. Very Quick Section

VERY QUICK LIGHT/VERY QUICK FLASHING/CONTINUOUS VERY QUICK LIGHT:

Characteristic: Flashes for this characteristic are very rapid with 100 or 120 flashes per minute as typical emission rates.
Comments: Very Quick serves as an overarching term for all Very Quick forms. DMA includes it with a flash of 80-160 per minute. IALA gives a rate of 100 or 120 per minute depending on whether electric or acetylene equipment is employed. USCG does not include this characteristic. "Continuous" applies to non-interrupted forms of Quick, Very Quick and Ultra Quick characteristics.
References: Pharos Marine, USCG LL PC 1991, DMA 1995

GROUP VERY QUICK LIGHT/GROUP VERY QUICK FLASHING:

Characteristic: Similar in patterns to Very Quick except that light emissions are in group.
Comments: Only limited sources include this characteristic and all are new or nearly so.
Reference: DMA 1995

GROUP VERY QUICK WITH LONG FLASHES:

Comments: This form follows the Group Very Quick pattern with the addition of Long Flashes at regular intervals similar to Group Quick pattern with Long Flashes.
References: DMA 1995

INTERRUPTED/INTERRUPTED VERY QUICK FLASHING/INTERRUPTED VERY QUICK LIGHT:

Characteristic: The emissions are those of Very Quick Flashing (V Qk) but with regular and lengthly eclipses (in the context of V Qk).
Comments: This characteristic is among the newer rapid flashing characteristics growing out of the 1980 IALA Buoyage Conference.
References: DMA 1995, Pharos Marine

III. Ultra Quick Section

ULTRA QUICK LIGHT/CONTINUOUS ULTRA QUICK LIGHT/ULTRA QUICK FLASHING:

Characteristic: This characteristic is of an extremely fast rate of light emissions: at least 160 units per minute.
Comments: The pattern is listed in IALA via Pharos Marine, DMA, Bowditch. Terms and meanings follow the patterns of Quick and Very Quick forms.
Reference: Pharos Marine, Bowditch 1984, DMA 1995

INTERRUPTED ULTRA QUICK LIGHT/INTERRUPTED ULTRA QUICK FLASHING:

Characteristic: This term follows the Ultra Quick rate but with lengthly (a relative term) eclipses.
Comments: References in the literature are those of other Quick, Very Quick, and Ultra Quick characteristics.
References: Pharos Marine

g) Alternating Forms

General Comments: Light apparatus display different colors in an alternating pattern in these forms. The term Alternating Light can be seen as an overarching term though Kerchove views it as referring only to fixed forms. Some sources list a variety of Alternating forms while other sources include the parent form and may or may not note that various characteristics may have an alternating pattern. Only Kerchove has Group Alternating (Fixed Light that changes color in groups).
References: Sutton-Jones 1985, Kerchove 1961, DMA 1995

The forms include:

ALTERNATING/ALTERNATING LIGHT
ALTERNATING FLASHING/ALTERNATING FLASHING LIGHT
ALTERNATING GROUP FLASHING/ALTERNATING GROUP FLASHING LIGHT
ALTERNATING OCCULTING/ALTERNATING OCCULTING LIGHT
ALTERNATING GROUP OCCULTING/ALTERNATING GROUP OCCULTING LIGHT
ALTERNATING FIXED AND FLASHING/ALTERNATING FIXED AND FLASHING LIGHT
ALTERNATING FIXED AND GROUP FLASHING/ALTERNATING FIXED AND GROUP FLASHING
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CHAPTER THREE

DAYBEACONS

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3B1 Overarching Terms

a) General Comments & Basic Terms

General Comments I: The question of an overarching term for Fixed Beacons that are not Lighted is not easily answered. IALA 1970 notes that Beacon can be either lighted or unlighted. IALA presents three terms for these Aids in English: Daymark, Beacon (prefaced by Unlighted for UK usage) and Daybeacons in US parlance. The French term Balise seemingly refers to unlighted Beacon forms. The German term Bake may refer to largely unlighted Aids.

Unlighted Beacon is a possible overarching term though few sources employed it. It is not satisfactory because the Beacon without a light is an authentic Aid in itself and not merely an Aid lacking an element present in another form. Beacon, even though it may generate confusion, is the most common term. Yet it seems less than adequate because of its ambiguity. This Database will employ Daybeacon even though a minority of surveyed sources included it. The German Bake, the French Balise, and the Norwegian Bake are also included in the Database. This is one of the few instances in the Database where foreign language terms are included. The inclusion is necessary because of the large number of Daybeacon/Unlighted Beacons in several European languages.

The subdivisions of Daybeacons also represent an ambiguous situation. Some are markedly clear while others are uncertain both in title and content. The subdivisions selected for this database include: Unidimensional, Natural, and Structural Marks. Because of the importance of Topmarks and Daymarks for Daybeacons there is a separate category for those Marks. That category pertains to Buoys and Fixed Lights as well. Unidimensional Daybeacons consist of Aids whose titles are clearly established: Perch, Pole, Post, Pile, Spindle. Natural Daybeacons include Trees, Tree Branches and Cairns (the later when in a largely natural form). Structural beacons are a problem in that only a limited number have clearly recognized names (Tripods, Dolphins, Multiple Piles) while others have no name save that of the parent name of Daybeacon. Yet others have no official or

common name save that of the overarching term of Daybeacon. Often times they can be listed under the description of the structure. This problem is discussed in General Comments II.

General Comments II: A problem occurs in naming the various kinds of Daybeacons/Unlighted Beacons/Balise/Bak: many have no name save Beacon (or Balise or Bak) while others are described as having a given structure yet that structure is not an official or common name. This is in contrast for many or most other Marine Aids. This Database can either eliminate all names save clearly recognized names, or it can include names that are not clearly perceived as names of Daybeacons.

Many unidimensional forms (Perch, Pole, Post, Spindle) are often clearly labelled and these labels qualify as a recognizable name. These terms are only infrequently accompanied by the word "Beacon" which would clearly denote what they are. By contrast, terms for kinds of Buoys often contain "Buoy" as an integral part of their title.

Structural Beacons (Aids, for example, of some size displaying a timber framework in a triangular or pyramidal form) frequently appropriate the overarching term of Beacon and lack any other name. The term Beacon becomes Beacon I when referring to the overarching meaning, and Beacon II for the specific forms.

Yet structural forms lack names that are recognized and listed in major sources. One can, for example, speak of them as Pyramidal Structure or a Pipe Frame since the structure is so described. Yet those names or descriptions do not appear in the sources of information; only the specific listing will contain that name. This can lead to a database overburdened with specific, localized and singular forms while the reverse process can lead to an elimination of any forms not found in major sources such as IALA 1970, IHB 1956, IHB 1971, UK Light Lists, USNOO/NIMA/DMA and USCG. The Structural Daybeacon group will examine this problem more thoroughly.

General Comments III. Classification of Daybeacon forms is incomplete both for overarching and for specific forms. A more coherent and comprehensive pattern

of classification designations will be attempted in the 2nd. Ed. Classification designations will encompass specified groups of terms rather than denoting a hit-or-miss range of entities as was the case previously.

DAYBEACON/DAY BEACON/DAY-BEACON.
Classification #: 23
Form of Aid: Marine Unlighted Fixed Aid to Navigation (Daybeacon)
Operation: This form of Aid is visual, fixed but unlighted. Older forms often consisted of the basic structurre. They were distinctive in design and contrasted well with natural backgrounds. Increasingly they follow the rules for beaconage and buoyage of IALA in reference to color and standard daymarks
Comments: See General Comments on terminology. The Classification encompasses all overarching forms; it can conceivably include all forms though some forms have separate numbers. The Main classification employed Unlighted Marine Fixed Aid instead of Daybeacon; Variant Classification, however, included Daybeacon.
References: IALA 1970, Bowditch 1966, Weiss 1926, Kerchove 1961, Johnson 1890

BEACONAGE. Term refers to a system of Buoys. It is comparable to Buoyage.
Reference: USNOO 1969

BEACONAGE SYSTEM.. A term in Part J; possibly coined for that study. It adds "System" to the basic term which may be redundant.
Reference: Part J

FIXED BEACON. A possible alternate for the overarching term. It may suggest Unlighted or Daybeacons though the term can also include lighted forms. At most it can be said that it leans toward unlighted forms.
Reference: Kerchove 1961

SHORESIDE MARKER This term appears in a definition of Beacon in Roger. It serves as a reference to Beacon and includes Beacon within it. But it does not have a definition of itself.
Reference: Roger 1985

UNLIGHTED BEACON/(UNLIGHTED) BEACON. An alternate for Daybeacon as the primary overarching term. A possible presupposition can be made that only Fixed Beacons are Beacons, and that Buoys are not Beacons though, admittedly, a case may possibly be made for their inclusion.
References: Bowditch 1966, Hague & Christie 1975, IALA 1970, Phillips 1949

b) Overarching Terms: Shared & Foreign Languages

BAK. A Swedish term which presumably is akin to Bake in Germany and in Norway. No further details are available.
Reference: Sweden 1985

BAKE. This is the core German language term for Unlighted Beacons/ Daybeacons. The plural form, Baken, is the source for the English language Beacon. It is the general term for fixed and unlighted Aids for Germany, and also for specific structural forms in Germany. The German "Bake" and Norwegian "Bake" are presumably linked linguistically.
References: IALA 1970, IHB 1971

BAKE. This is a key term for Norway's Kystdirekoratet in Oslo. Fast Sejmerkers (Fixed Sea Marks) is a more overarching form but it goes beyond Unlighted Beacons. Norway has the largest system of Structural Beacons extant; hence the inclusion of Bake in the Database.
Reference: Norway 1979

BALISE. Balise is the primary French term for the Unlighted Beacon. IALA 1970 notes that Balise usually refers to unlighted forms. A more specific term, Balise Fixed, is also employed. Older forms include towers presumably of stone or of masonry though data on current forms is limited in contrast to German and Norwegian sources.
References: Naish 1985

BALISE FIXE. A more precise term than Balise but it is unclear whether it refers exclusively to fixed and unlighted forms.
Reference: IALA 1970

BEACON. This term is employed by a variety of sources, especially English, as a general term for Daybeacons/Unlighted Beacons. It can also suggest lighted forms (as noted in IALA) and possibly floating forms. It remains an important term for Daybeacons but it also remains ambivalent because of multiple meanings that encompass floating, fixed lighted and electronic forms. Buoys are often frequently excluded though on occasion they are included.
Reference: Adamson 1952, Rogers 1985, USNOO 1969, IALA 1970

DAYMARK/DAY MARK/DAY-MARK. This term has multiple meanings including an object attached to a physical structure which greatly enhances the safety aid capability of an physical Marking; the day aspect of any Aid to Navigation, and unlighted and fixed safety Aids. While it does not have a central place in this Database it nonetheless needs to be included. The French Aids to Navigation agency employs Day Marks in the English translation of the French technical manual.
References: Putnam 1913, Johnson 1890, Langmaid 1966, France 1986

STATIONARY BEACON. A term seemingly exclusive to UK 1861. It refers to Fixed Beacons presumably in contrast to floating forms or Buoys.
Reference: UK 1861

STEHENDE BAKE. The German transfer of Fixed Beacon. It is not clear if this is an exclusively unlighted form.
References: Kerchove 1961, IALA 1970

3B2 Special Topics: Topmark & Daymark Forms

a) General Comments

Daybeacons are frequently accompanied by an object which is not part of the core physical structure. Many of these additions are known as Topmarks. Topmarks are relatively small objects of a specific design added to an Aid.

Topmarks displayed the shape of barrels, cages, baskets or brooms in older forms while newer forms followed the patterns of the lateral system of the League of

Nations and IALA. Since Topmarks are attached to the Daybeacon they are an integral part of the Aid and require inclusion in the Database. Topmarks are both a physical appendage and part of a message system. They are mounted on the top of Daymarks or other Markings. They are identified by shape and/or color. Topmarks may be of a single form or they may be composite.

Daymark can be viewed as an alternate to Daybeacon though in the US and some other nations, the Daymark is the visual part of the Aid. This double meaning of Daymark (as the visual aspect of any Aid, and as a special entity designed, constructed and attached to a structure which conveys a message) is included in the Database in a twofold manner: by description of the entire Aid, and by an examination of the special entities of Topmarks and Daymarks. This Special Topic reviews Daymarks in the US, Canada, Finland and other nations. Topmarks can be examined under four headings: historical (which may extend into contemporary times), the League of Nations buoyage system, IALA 1980 forms, and individual forms as given in IHB, UN and other sources.

b) Topmarks

BARREL, CAGE/CAGEWORK, BASKET, CROWN, BROOM, GLOBE, BALL, BALLOON, TRIANGLE. The Broom is an especially notable form because of its long-enduring character and its composition. It continues to find use. It is not found in the IALA system though that does not preclude its use by individual states. In some forms it is literally an assembly of twigs. It is sometimes known as a besom. In the League of Nations system an upturned Broom denoted port while a downturned Broom indicated starboard. Denmark offered an option of one, two, or three Brooms in both downturned and upturned forms. The Broom is probably the most important Topmark in a historic sense. The other historical forms are less common yet past and present examples are easily located. Globes may conceivably represent an older term for Sphere; Triangle may represent an older version of Cone.
References: Naish 1985, Hague & Christie 1975, UK 1861, Kettle 1896

CONE, CAN, SPHERE, DIAMOND, ST. GEORGE'S CROSS, "T", BROOM. Topmarks for the League of Nations include historic forms as well as some

different versions. The Broom was continued for this system. Composite forms are also employed in LN. LN correctly employs the term St. George's Cross as one of three forms of the Cross found in the literature. The other forms are St. Andrew's Cross, and the Lorraine Cross. However, such terms as "Double Cross", "Upright Cross", and "Plus Sign", "Slanting Cross" and "Recumbant Cross" seem to have supplanted the older forms. References to these Topmarks will note newer forms but include the traditional forms as well.
References: IALA 1970, LN 1936, IHB 1956

CONE, CYLINDRICAL (CAN), SPHERE, "X". IALA 1970 labels the formerly termed "Can" Topmark as "Cylindrical" with can as a secondary name. Only three of the LN forms are kept though the St Andrew's Cross under the name of "X" is added. Composite forms are also employed.
Reference: IALA 1970

TRUNCATED CONE, CYLINDRICAL (RECTANGLE), ELIPSE, SPINDLE (ELONGATED ELIPSE SHAPE), SANDGLASS (TWO CONES POINT TO POINT), HEMISPHERE, WISPS. These forms are found in national literature and in IHB 1956, IHB 1971.

c) Daymarks

General Comments I: There is some confusion over ther term Daymark. IALA 1970 states that Daymark is the US term for Topmark. Yet the term Topmark is now employed in the US, and it has the meaning found in IALA Buoyage System of 1980. Daymarks are generally large objects affixed to an Aid (but not to the top of the Aid). Daymarks can also refer to the day portions of any Aid. Daymark can have a third meaning: as an alternate name for Daybeacon or Unlighted Beacon. In this segment the term Daymark refers to a specific object added to a structure in order to enhance its message capabilities.

General Comments II: Marine Aids that manifest an enhanced message capability lack an adequate overarching name. Topmark includes part of the message system though not all of it. Daymark, in turn, manifests another portion. Enhanced messages also include the arms of Norwegian Seamarks as well as pointers in the

US Intracoastal Waterway but such additions are seemingly outside Topmarks and possibly Daymarks as well. Norwegian Aids are closer in definition to Daymarks than Topmarks except for their position on the Aid. USNOO refers to a Daymark as being a "conspicuous target added to a daybeacon... ." Target, a familiar term in Railway Signaling, may offer an overarching term for the entire assemblage of Topmark, Daymark, Pointer, Arm and other terms. Target will not be adopted for this study though it remains a possible solution to the welter of partial and unclear terms.
References: USNOO 1969, Kystdirectorat 1979, Weems 1940

DAYBOARDS. USCG has employed this term in light lists in a description of shapes, colors, and meanings of what are often termed Daymarks. It is possible that Dayboard is employed to designate the physical object of shape and color while Daymark designates the same object in its message producing function. US Corps of Engineers refers to signs and words and other symbols on the Dayboard as Daymarks. Those usages of Dayboard and Daymark suggest the sign-vehicle and meaning of sign in a semiotics sense.
References: USCG LL 1991, US Army Corps of Engineers 2006

DAYBOARD SYSTEM. This term refers to elements from which navigation signs are constructed: backing, adhesive, "colored substrate." See Also: Dayboard, and Daymark.
Reference: Mercardo 1990

DAYMARKS/DAY MARKS/ DAY-MARKS. The US employs a range of geometric shapes for Daymarks: triangles, diamonds, octagons, rectanges. These forms display a variety of colors, secondary colors, other symbols. Many operate within the lateral system though some are outside of it. A special category is that of Range Aids which are two-unit Aids physically separated though integrated in operations. The US often employs rectangular forms for this function. Canada frequently uses truncated triangles. Finland employs the term Leading Lines which employ rectangles. Daymarks refer to both Daybeacons and to Lighted Aids.
References: USCG LL PC 1991, Canadian AN 1975, Finland, Chadwick 1971, Wryde 1913, Phillips 1949

ARMS. This term may be peculiar to Norway. It refers to appendages attached to various Fixed Seamarks which denote direction of fairways, etc. It seems to be akin to the term Pointer from US Intracoastal Waterway Markings. Both terms are seemingly apart from Topmarks.
Reference: USCG LL A-I 1970, Kystdirectorat 1979

POINTERS. A US term found in the Intracoastal Waterway. It can be viewed as separate from Daymarks. It is similar to Arms in Norway.
Reference: Weems 1940

3B3 Special Topics: Morphological Daybeacons

General Comments: Many Daybeacons are physical entities and their names reflect that state. However, some Daybeacons reflect the function instead of the physical state. To borrow biological terms, these Daybeacons are morphological rather than physiological entities. In some instances it is difficult to distinguish function from the physical dimension. And both aspects may be reflected in the name. And the name may not clearly separate lighted Aids from fully unlighted forms. In a sense the coverage in the Database may tend toward the physical. That is because an unlighted Aid encompasses the physical and much of the functional dimension within "one package."

a) Leading/Range Marks

CLEARING MARKS/LEADING MARKS/LEADING-MARKS/RANGE MARKS/RANGE BEACONS/RANGE TARGET MARKS/RANGE TARGET MARKERS/DAY-BEACON RANGES. These terms refer to Markings displaying at least two units arranged in a straight line denoting the desired channel path. All of these Marks include lighted and fully unlighted forms. USNOO includes Ranger Target Markers. Sweden has a variant form of Range Target Marks
References: USNOO 1969, IALA 1970, Kerchove 1961

CROSSING TRANSIT MARK. UN ECAFE in 1957 promulgated a "Uniform Systems of Buoys and Shore Marks" for the ECAFE region. This system was heavily influenced by older LN work. This term is a Fixed Aid and refers to

Range Marks. The French term, "Alignements Axiaux" (center line) clarifies its use.
Reference: UN 1957

TRANSIT MARKS. Naish notes that some older beacons were placed in alignment and thereby carried out a Transit Mark function though they were of a Beacon form.
Reference: Naish 1985

b) Signals

DOCK SIGNALS/HARBOR SIGNALS/LOCK SIGNALS/TIDE SIGNALS/ PORT SIGNALS/TRAFFIC SIGNALS. Many of these entries may employ lights for their messages. Yet unlighted forms may also be present.
References: Kerchove 1961, IALA 1970, Tver 1987

c) Other Forms

BUOY RANGE MARKERS. This refers to a Fixed Aid of stakes forming a range through a buoy's position. They mark Buoys on the Tennessee River in "dredged cuts."
Reference: Monroe & Stewart 2005

CABLE MARK. This term refers to an Aid denoting ends of cable.
Reference: UN 1957

CROSSING MARK. This term refers to a Fixed Aid of one unit in contrast to Crossing Transit Mark which is a Range Mark with two units.
Reference: UN 1957

DIAMOND BEACON. This Beacon combines physical and functional aspects. It is an European Aid that denotes entrance to a middle ground through a display of diamond shaped panels which can be termed topmarks or daymarks.
Reference: Kerchove 1961

MAIN BANK MARK. This term refers to two Aids: one denoting port or left, and one indicating starboard or right. They are Fixed Aids.
Reference: UN 1957

MARK INDICATING BANK TO HUG. A term that is also self-explanatory. It is a Fixed Aid.
Reference: UN 1957

MARK INDICATING PROHIBITED ENTRANCE OR "DANGER". A term that is self-explanatory. It is a Fixed Aid
Reference: UN 1957

RECOGNITION BEACON. Term for very tall masonry Beacons in England in 18th/19th centuries.. The Aids could be seen, recognized at quite some distance out to sea. Hence their name. The shapes of the Beacons were also distinctive.
Reference: Naish 1985

REGULATORY MARK. Monroe and Stewart speak of this Aid as displaying white and orange colors. Pattern, shape and construction of Aid not given. It presents a message with special meaning (e.g. danger).
Reference: Monroe & Stewart 2005

SHORE MARKS. A possible overarching term though employed by UN 1957 as an overarching term for specific morphological forms of Fixed Markeds used in a combined beaconage and buoyage system.
Reference: UN 1957

WINTER MARKER. This Aid substitutes for a regular Marking during the winter. It can be either floating or fixed. It lacks light and sound dimensions.
Reference: USNOO 1969

WARNING REGULATORY MARKER. USCG 1977 is the only surveyed source that lists this Aid. It probably includes Beacons that display word and numerical messages. Warning and Regulatory suggests a conflation of two distinct message forms: those that give warning and those that given regulations.

Reference: USCG 1977

3C Physical Daybeacons

3C1 Unidimensional Daybeacons

a) Established Names

BEACON POLES. Employed only by Naish 1985 who also includes Pole Beacon (as well as Perch Beacon, and Beacon Perch). It can be suggested that the title refers to a Pole serving as a Beacon instead of referring to a Beacon that is in pole form. Buoy forms are usually two words: Buoy plus the form (Can, Pillar, Lighted, etc). While Daybeacons, especially in unidimensional forms, omit Beacon or Daybeacon from the form. Naish corrects that anomaly by providing two word titles.
Reference: Naish 1985

PERCH. General Comments: Unidimensional Daybeacons are listed under a plethora of titles. Perch is the preferred term for about a quarter of the surveyed references in the first edition. Spindle was the second most common term; it was largely confined to the US. Pole and Post are two other commonly used terms. The various terms are often not fully defined though perhaps they can be employed as synonyms and are interchangeable. Yet differences in meaning exist and it would therefore be imprudent to overlook differences by omitting some of the terms. The English language term, Perch, derives from the Old French term Perche with the meaning Pole. Pole is often the definition (albeit a circular one) for a variety of terms relating to unidimensional Markings.
Classification #: 27. 271
Comments on classification: Perch and Pole are found together in the Variant Classification. Nonetheless, both have given entries. Other terms are also listed in the classification since they have some measure of independent existence though the terms often run together and even merge.
Form of Aid: Marine Unlighted Aid to Navigation
Operation: Increasingly Perch and other Daybeacons follow the patterns of the IALA lateral system. Message colors as well as Topmark and Daymark forms

reflect Buoyage practice. Some simple forms of the Perch designate channels and obstructions by their mere presence; some display Pointers or Arms.
References: H & C 1975, IHB 1956, Layton 1982

PILE.
Classification #: 27.272
Form of Aid: Marine: Unlighted Aid to Navigation
Operation: The Pile consists of a single pile often on a marine site displaying some form of Pointer, Topmark, or Daymark. It is frequently employed in accord with the lateral system.
Comments: The Pile may suggest a more substantial unit than the Post, Pile or Perch though, to be sure, all of these terms tend toward the nebelous. This is also true of variant terms including Single Pile Beacons, Single Steel Piles, and Steel Piles. Pile can also refer to Multiple Piles. The multiple form is listed in the Structural Daybeacon segment.
References: IHB 1956, USCG LL PC 1991, IALA 1970, Layton 1982

PILE BEACON/PILE-BEACON. This term is somewhat vague in meaning. While it may consist of one pile it may conceivably consist of several piles.
Reference: USNOO 1969, UK 1861

PILLAR. A frequently employed term in Buoyage. The Pillar Buoy has a substantial superstructure of a relatively slender design. Pillar is less often employed in Fixed Aids to Navigation. However, IHB uses the term to describe the various Perches and narrow Beacons in Norway. Hague & Christie includes it along with Posts, Poles, Perches and Post-Marks in a seemingly interchangeable manner.
References: IHB 1956, IHB 1971, H & C 1975, Stevenson 1959

POLE
Classification #: 27. 271
Form of Aid: Marine: Unlighted Aid to Navigation
Operation: Shape is, of course, only one element the message capability of this Aid. Pointers, Topmarks, Daymarks, and the Lateral System all provide possible dimensions for messages.
Comments: Only about one in ten of surveyed sources in the first editions

included this Aid. Yet it is often hidden in other terms. It provides the definitions of some terms, and is the English equivalent of the original French term, Perche. Masts, Spindles, Posts can all be regarded as Poles. Denmark in UK 1861 divided Poles into Larger Poles (Spiirbaaker) and Smaller Poles (Stikbaaker). Both Pole and Perch are in the classification and listed together. Yet the terms have some measure of independence.
References: Hague & Christie 1975, Sweden 1985, UK 1861

POLE BEACON. This is most likely a single unidimensional object of some height; quite possibly supplemented by Topmark or Daymark. The lateral system determines color and other message patterns. IALA gives this term as the primary English language term for this Aid (unidimensional form) which IALA describes as a Spar.The commonly and historic term of Perch is not employed by IALA in the English edition.
Reference: IALA 1970

POST/POST BEACON/POST BEACON STRUCTURE. Post is another term for unidimensional marks that is of uncertain meaning and which may be inter-changeable with similar terms. Only a few surveyed sources include it though OED employs it as a definition of some other forms of Aids including Piles and Stakes. USCG lists Post Beacon which appears to be a variant name rather than a variant form.
References: OED Vol VII, H & C 1975, Conway 1915, USCG 1979, USCG 1990

POST-MARK. This Aid is included by a single surveyed source. It is seemingly a synonym for Perch. It is found among a welter of terms with overlapping or interchangeable meanings.
Reference: H & C 1975

SPAR. Spar is a term that would seemingly be applied often to Unlighted Beacons yet it is only infrequently so applied. IALA describes the Pole Beacon as a Spar though that is an indirect usage.
Reference: IALA 1970, USCG 1943, Stevenson 1959

SPINDLE/SPINDLE STRUCTURE. A term found almost exclusively in the US;

it is a common and historic form of Daybeacon in New England. It is no longer a standard form though some remain in use. Contemporary Daymarks accompany the remaining Spindles. Fixed Spindles may be seen as a vertical rod or post though Spindle Buoys are a tapered entity. Many Spindles are undifferentiated though some are listed as a Iron Spindle or Pipe Spindle. Those forms are listed in Local Names. Spindle Structure is included here since it is a variant name rather than a variant form.
References: OED, USCG 1962, USNOO 1969

b) Local Name Group

BOARD. This term is a possible anomaly in Unidimensional Markings since many Aids not only display a single vertical dimension but are often very slender. Seemingly only Sweden includes this Marking. Details are lacking.
Reference: Sweden Adm. 1985

BRACED POLE. This may represent a mislocated Aid. The Pole is supported by very slender braces which suggests a unidimensional entity though a case can be made for regarding it as a Structural Daybeacon.
Reference: USCG 1964

CHANNEL STAKE. A small slender object that marks channel limits. A fuller explanation can be found under Stake.
Reference: USCG LL 1962

COLUMN. A rarely used term. It suggests a unidimensional unit of moderately large circumference. It is probably of a solid mass.
References: Admiralty 1952

CONCRETE PILE. A rarely mentioned Aid. It is confined to the USCG. The term adds the material of construction to the basic form. USCG 1991 speaks of a Single Pile while USCG LL 1970 employs Concrete Pile. Single Pile is also included in this study.
References: USCG LL 1970, USCG 1979

EDGEMARK. This term is apparently employed only by the Finish Board of Navigation. It is comprised of a steel tube installed in the bottom of the navigation channel. It suggests a morphological entity yet it is more of a physical construction.
Reference: Finland 1983

I-BEAM/I-BEAM MAST. A rarely employed term of Marine Aids. USCG formerly employed both versions. The Mast is of uncertain proportions but it is possible that it consists of a conventional construction I-shaped beam set on end and accompanied by a Daymark.
Reference: USCG LL 1962

IRON PILE. A rarely employed term. The material of construction is added to the form. It is possibly confined to US usage. Steel Piles, by contrast, are a common designation.
Reference: USCG LL AT-II 1970

IRON PILLAR. Wryde 1913 includes the material of construction while the primary entry of Pillar focusses on the generic term.
Reference: Wryde 1913

IRON POST. This term is conceivably an Aid that can be either lighted or unlighted. The single source for it is from the 19th century that suggests a Day to some degree. This Aid is also listed in Lighted Aids.
Reference: Kettle 1896

IRON SPINDLE. While many Spindles are listed by the core term, there are some differentiated by the addition of the material of construction as in this case. In other cases the term describing form or shape is added. It is not known if Iron Spindles are notably different from undifferentiated forms.
Reference: USCG LL PC 1962, USCG LL AA-I 1979

MAST. An infrequently employed term for Unlighted Beacons. This may suggest a unidimensional object taller than Aids listed under the apellations of Perch, Pole, Post, etc. The Mast is seemingly a US Aid that is non-standard and possibly

no longer in use. Kerchove speaks of Sandbank Beacons and note that they are often of a Mast form.
References: USCG LL PC 1962, Kerchove 1961

PIPE SPINDLE. Since few Spindles are labelled as Pipe Spindles it is possible that those so designated are at variance with Spindles known simply as spindles. Perhaps the material of construction has resulted in a visually variant form.
Reference: USCG LL PC 1962

POST-MARK. This term is included only by H & C; it is apparently a synonym for Perch. Post-Mark is positioned among a welter of terms with overlaping and/ or interchangeable meanings.
Reference: H & C 1975

SANDBANK BEACON. Kerchove informally divides -- or so it seems -- Unlighted Beacons into land forms and sandbank forms. The sandbank form is more of a morphological than a physiological form. Though the source in question notes they are of a Mast type and hence are included here.
Reference: Kerchove 1961

SHAFT/IRON SHAFT/STONE SHAFT. A rarely employed term suggests a unidimensional entity of larger circumference than a pole or post. There are few references in the literature to it and it may be only of historic interest.
Reference: USCG LL-A-I 1979

SINGLE POLE.This term represents a shore structure with a single pole. There is a lighted form as well. Single Pile contrasts with Single Pile, a marine structure.
Reference: USCG 1964

SINGLE PILE. This term is a marine structure of one pile. There are many Markings that include the word Single Pile but in nearly all cases a qualifying word(s) is added. The term contrasts with Single Pole, a land Aid.
Reference: USCG 1979

SINGLE-PILE BEACON/SINGLE PILE STRUCTURE. This represents an

alternate to Pole Beacon or Spindle; it is of US provenance as noted in IALA. USCG 1974 offers an alternative with Single Pile Structure.
References: USCG 1943, IALA 1970, USCG 1974

SINGLE PILE-WOOD/-CONCRETE/-STEEL/SINGLE PILE WOOD BEACON STRUCTURE/-STEEL BEACON STRUCTURE/-STEEL BEACON STRUCTURE/-CONCRETE BEACON STRUCTURE/SINGLE PILE STRUCTURE/ SINGLE PILE-WOOD STRUCTURE/-STEEL STRUCTURE/CONCRETE. These terms are very similar as are structures; materials, however, vary.
Reference: USCG 1974, USCG 1979, USCG 1990

SINGLE STEEL PILE. This represents a further differentiation of Pile and Steel Pile. It gives the number of piles involved (which is one) and removes whatever vagueness of Pile or Steel Pile may exhibit.
Reference: USCG LL PC 1991

STAFF. This term may approximate a Perch or other slender object. It is also included in Lighted Aids.
References: Kettle 1896, McEwen 1953

STAKE. It is variously described as a stick that is stout (OED) or a post that is slender (McEwen). It suggests an Aid intended for less ardous, less exposed functions; possibly of smaller size than Perches, Posts, etc. It is likely employed in channels where conditions require frequent relocations. Channel Stake is probably similar though more specific in regard to locate and purpose.
References: McEwen 1953, Conway 1953, OED 1933, Vol X

STEEL PILE. An alternate for the Pile that includes the material of construction in the title.
Reference: USCG LL PC 1991

STUMP. This term appears in a Swedish chart explanation. It is a Fixed Aid of simple design and construction.
Reference: Sweden 1985

WOODEN POSTS. Mention of this Marking is confined to Wryde 1913 among surveyed sources. It includes the material of construction and employs Wooden rather than Wood which may suggests its historic, if not archaic form.
Reference: Wryde 1913

WROUGHT IRON MAST. A historic entry which adds material of construction to the basic term.
Reference: Chadwick 1971

WROUGHT-IRON POST. This term appears in a Swedish chart explanation though with few details.
Reference: Sweden 1985

3C2 Structural Daybeacon Forms:

a) General Comments

I. Structural Beacons, as noted earlier, encompass several forms: 1. Beacons bearing no name save the "parent" name of Beacon/Bake/Balise/Daybeacon; 2. Forms with a specific name (for example, Tripods, Towers); 3. A large assemblage of structures without a specific name other than that of structure with the possible addition of the name, of the shape of the marking, or of the construction materials or configuration of the materials. Aids labelled as Frame/Framework and Construction may also be contained within this designation.

II. The term Structure is not as ambiguous as it may first appear. The structures frequently follow established patterns of shapes, sizes, colors and other distinctive elements. They manifest sharp contrast with their surroundings. They are often of an open framework design though enclosed and lattice-work forms are in use. Construction materials include timbers, pilings, iron and steel structural bars.

III. Structural Daybeacons can be classified (.28: Open Structures; .29: Enclosed & Solid Structures) but the overarching term encompasses a wide array of Aids and therefore any classification is such only to a restricted degree.

b) Structural Daybeacons Employing Parent Name

BAK. This term from Sweden is also listed in Overarching Terms. It represents a structural term as well as a more general term.
Reference: Sweden 1985

BAKE
General Comments: This term finds multiple employment in Daybeacons. It is the basic German language overarching term for Unlighted Beacons but it is also the German language term for both German structural Beacons, and a primary term for Scandinavian Beacons especially those of Kystdirektorate in Oslo. Bake I can be regarded as the overarching term general term while Bake II refers to specific German Beacons. Norwegian Bake can be designated as III.
Classification #: .28. 285
Form of Aid: Marine Unlighted Fixed Aids to Navigation
Operation: It consists of a wooden structure in triangular, rectangular or pyramidal shape that offers a distinctive contrast with the natural surroundings of water, shoreline and other features. It may display a time framework or a slatted appearance. It may display a color pattern reflecting that of the IALA lateral system for Region "A". In some instances it displays a topmark that is also in accordance with IALA.
Comments: See general comments under first Bake entry.
References: IALA 1970, IHB 1956, IHB 1971, Kystdirectorat 1979

BAKE II. This form is a wood structure in rectangular or pyramidal form. The rectangular form is braced by supports of a diamond design and topped by a similar construction. Color patterns are from the lateral system. The German Bake shares the name with the triangular form of the previous entry.
Reference: IHB 1956, IHB 1971

BAKE III. This is a Norwegian form of the Bake and it is a specific name for this Aid since the overall name for Norwegian Unlighted Beacons is that of "Faste Merker/Fixed Markers". There are two forms: one form is slightly pyramidal and slatted in appearance. It may be black in color with a white band and display

directional arms. The second form is tripodal in shape with a Top/Daymark. It may be solid black in color.
Reference: Kystdirecktorat 1979

BEACON. This term has been discussed in Overarching Terms and Shared Terms sections, but it needs inclusion here as well. Beacon in UK usage frequently referred to a solid tower of stone or brick and of notable height. IALA places Unlighted in () before Beacon to denote the English definition of the word. It is not altogether clear whether such names as Masonry Beacon and Tower Beacon are actual names of a type of Beacon or a descriptive addition to the word Beacon.They are included in the Database since they are possibly independent forms.
Reference: Hague & Christie 1975

c) Structural Daybeacons with Established Names Forms

DOLPHIN
Classification #: 28.280
Form of Aid: Marine Unlighted Aid to Navigation
Operation: It presents a visual message through its appearance: a group of pilings implanted in a river or harbor bottom at an angle and tied together at the top. Top-marks and Daymarks may be present.
Comments: IALA includes an illustration of the Dolphin but without an English language name. Yet Dolphins are a major US Aid at least in the past. They can be unlighted as well as lighted. Germany is also a major user of Dolphins. Naish notes that Dolphin has supplanted the name Tripod Beacon. Dolphin and Multiple Pile share the classification number.
References: IALA 1970, Naish 1985

TRIPOD/TRIPOD BEACON
Classification #: 28. 281
Form of Aid: Marine Unlighted Fixed Aid to Navigation
Operation: Tripods present a visual message through its distinctive three-leg appearance which may be accompanied by Daymarks or Topmarks.
Comments: Tripods are not included in IHB, LN or IALA but other major sources

include them. Naish notes that Dolphin has replaced Tripod. Tripod Beacon can be seen as an alternative title. Langton 1944 speaks of an Iron Tripod which adds the material of construction to the basic shape; that form is listed under Local Names.
Comment: Classification includes Tripod only.
References: H & C 1975, Naish 1985, Conway 1915, McEwen 1953, Langton 1944

d) Structural Daybeacons with Local/Descriptive Names

CYLINDER. Hague & Christie speak of Masonry Beacons as having two dominant forms: cylinder or obelisk. The Cylinder often displayed "a tall conical steeple-like top". While the overarching name is that of Masonry Beacon the form is that of a cylinder and is included under that name as well.
Reference: Hague & Christie 1975

CYLINDRICAL STRUCTURES. Edwards includes mention of this Aid in a listing of Beacons in his 1884 tome on Seamarks. No details are given.
Reference: Edwards 1884

ENCLOSED STRUCTURE. This term is from Part H. The term can encompass a wide range of structural Aids that are of a solid nature. Classifications need terms that bring together terms as well as specific terms.
Reference: Part H 2004

FRAME/FRAMEWORK/FRAMEWORK STRUCTURE. A somewhat vague term. It may suggest a more open, less massive structure. USCG listings add qualifying words such as square and pipe to the basic word of Frame; Structure may also be added to Framework. Specific lateral system or other Markings would likely accompany the physical structure.
Reference: Admiralty 1952

IRON BEACON/STONE BEACON/WOODEN BEACON. These are marginal terms in all probability. These three terms are translations of the Norwegian Bake and Varde. They are so presented in English form in both IHB and Norwegian

publications.
References: IHB 1956, IHB 1971, Kystdirectorate 1979

IRON CONE/POINTED CONE. A historic entity only. It consisted of a iron hollow form filled with concrete.
Reference: Chadwick 1971

IRON FRAMEWORK. Edwards refers to a variety of Unlighted Beacons by name though often without description. This is one such entity.
Reference: Edwards 1884

IRON TRIPOD. Tripod is listed among Established Names but this version containing the material of construction is listed here. That is possibly too nuanced a differentiation.
Reference: Langton 1944

KAPEN/CAAPEN. Naish notes that the Kapen (from Cape) is a larger and more complex form of the Bake. It may be only of historic significance and lack current usage. Caapen is a variant term found in Dutch and Plattdeutsch languages.
Reference: Naish 1985

LATTICE-WORK STRUCTURE/LATTICEWORK. Both terms are from Parts C & D. They are employed to describe a Norwegian Beacon. However, that is not the term applied to the Beacon. In English it is a Wooden Beacon. And in Norwegian it is a Bake. [Needs language mark].
Reference: Parts C & D, Kystdirektoratet

MASONRY BEACON. As noted in the Shared Names section, Masonry and Tower Beacons may or may not be an actual name. They may simply be an effort to describe a specific form of Beacon. Nonetheless, the descriptive addition has some degree of the quality of a name. These are generally enclosed structures of some height and often of considerable age.
References: H & C 1975

MASONRY STRUCTURE. Several sources refer to this form of structure.

Details are frequently brief. The structure is presumably of distinctive shape and lacks a lighted dimension.
References: USCG 1943, Dutton 1958

MULTIPLE PILE. This form of Marking consists of a group of pilings (whether a structural assemblage or simply several piles grouped together). It may approximate a Dolphin. Variant terms are included in the following entry.
Reference: USCG 1979

MULTIPLE PILE STRUCTURE/MULTIPLE STRUCTURE/MULTIPLE PILE-CLUSTER DOLPHIN/MULTIPLE PILE-BATTERED DOLPHIN/MULTIPLE PILE-PLATFORM STRUCTURE/MULTIPLE PILE-CLUSTER DOLPHIN STRUCTURE/MULTIPLE PILE-BATTERED DOLPHIN STRUCTURE. These terms are seemingly confined to the USCG. They consist of two or more pilings in various arrangements. See also previous entry.
References: USCG 1979, USCG 1990

OBELISK. Hague & Christie indicate that Obelisk was a major shape for Masonry Beacons in the past. See Cylinders for a fuller entry.
Reference: Hague & Christie 1975

PILE STRUCTURE. This is a common form of structure for both unlighted and lighted Aids especially in the past. It can mean pilings that are similar to smaller utility poles though it can also include plastic, concrete and steel members. Some wood forms have the shape of squared off timbers. Older forms may have included a divergent group of Topmarks while newer forms may conform to the more standardized Topmarks and Daymarks of the IALA system.
References: USCG LL AT-II 1970

PIPE FRAME. An infrequently employed term; possibly historic only. Similar terms include Frame/Framework. This is probably of light weight construction.
Reference: USCG 1974, USCG 1979

PIPE TRIPOD. Tripods can be listed in a variety of sources without inclusion of materials of construction. This specific form is more detailed. It is possibly a local and even historic Aid that appears in a USCG Light List.

Reference: USCG LL PCPI 1962

PYRAMIDAL STRUCTURE/PYRAMID/PYRAMIDAL STONE STRUCTURE. Pyramidal is a common shape for various Aids. Possibly because it is sharply at variance with natural surroundings. The comments on structure can apply here. Older forms may have consisted entirely of the physical structure though newer versions would conform to the more standardized Topmarks and Days of the IALA system. Pyramid is found with Minor Lights but UK 1861 includes it as an Unlighted Beacon. It seems appropriate to attach that form to the Pyramidal Structure.
References: USCG 1970, UK 1861, USCG LL AT 1979, USCG 1974

SKELETON STRUCTURE. This may suggest a shortened Skeleton Tower. Such towers are open and frequently constructed of slender steel bars or extrusions. The term is localized, infrequently employed and admittedly vague. This is true of many entries in this segment of the Database.
Reference: USCG 1962

SKELETON TOWER
Classification #: 28. 283
Form of Aid: Marine Unlighted Fixed Aid to Navigation
Operation: This Aid offers contrast with natural backgrounds as do other Structural Daybeacons and is presumably augmented by a Daymark in compliance with the lateral system.
Comments: This Aid has official status, at least in the US, though it is usually accompanied by a light and in those instances it is listed under Fixed Lights. It consists of pieces of structural steel bolted together; the height can vary greatly.
Reference: Finland 1980, USCG LL

SLATTED STRUCTURE. This entity may well have been of wood construction because of the presence of slats (wood laths). The use of "structure" suggests it is not of tower dimensions. It can be viewed as of non-standard usage. Lateral system Markings would complete newer forms of this Aid; older versions of Daymarks might be nothing more than the structure and possibly supplemented by more historical versions.

Reference: Hill 1958, USCG 1943

SLATTED TOWER. Terms refers to an Unlighted Aid of a partially open design and construction.
Reference: USCG 1943, Dutton 1958

SMALL HOUSE. This term can represent an official form of an Aid or it may simply describe the form or size of House for a Light List description.
Reference: USCG LL PC 1991, Parts C/D

SQUARE FRAME. A rarely employed term for an Aid of imprecise dimensions and appearances. It is possibly of light weight construction. It was employed in the US and possibly only from the past.
Reference: Conway 1915

STONE MONUMENT. One source speaks of "Monuments of Stone" hence this title. It is not clear whether this is a Cairn or more of a stone construction.
Reference: Conway 1915

TIMBER STRUCTURE. A possibly obsolete term though more accurate in some respects than pile structure since it includes the material of construction and thereby suggests something of the shape. A Daybeacon quite likely included a Topmark or Daymark in order to be an effective Aid. Newer forms would confirm to the lateral system
Reference: Conway 1915

TIMBERED BEACON. A term possibly coined by the compiler. It appears in Part J and may have extrapolated from materials on historic Beacons in Naish .
Reference: Part J

TOWER BEACON/BEACON TOWER. Admittedly a vague term. It suggests a traditional beacon of stone or brick and of an enclosed nature and of notable height. Masonry Beacon and Beacon in the Shared Beacon terms sections includes this form of Aid. Beacon Tower may suggest a Lighted Aid but UK 1861 includes it in an unlighted form.

Reference: Kerchove 1961

TRIANGULAR STRUCTURE. This Marking, like the Pyramidal Structure, is a basic geometric shape that contrasts well with natural backgrounds. Daymark qualities may be inherent in the structure though lateral system symbols or other additions may be present.
Reference: USCG 1962

VARDE. This is a Norwegian Aid. Varde can be translated as Cairn yet the Varde is a deliberate construction of modified pyramidal shape. If Cairn is a more or less random piling up of stones then Varde is not a true Cairn. Kystdirecktoratet gives Stone Beacon as the English translation of Varde.
Reference: Kystdirectorat 1979

WOODEN FRAMEWORK. Parts C/D includes this term. No other reference has been found. The term may have been uncovered during a survey of sources for terms many years ago; it is possibly from a USCG or DMA Light List. There are other terms containing Frame or Framework.
Reference: DMA 1976, Parts C/D

3C3 Natural Marks

General Comments: This group can be divided into tree and rock (cairn) segments. There is considerable uncertainty -- including a provisional character -- about these Aids. Nonetheless, they represent an ancient and still contemporary aspects of Marine Aids to Navigation.

BIRCH TREE BEACON. An ancient and yet contemporary Marking employed for marking channels especially in Northwestern Europe. See Petit Arbre, Withy, Pricken.
Reference: Naish 1985.

CAIRN. This is also an ancient Aid. It consists of stones heaped up in a distinctive shape. Stones employed in a structure or construction that manifest a more artificial or human-altered shape are more correctly termed a Structure or

Construction with the word Stone attached to the appropriate word. Sweden seems to distinguish between Kummel which can be defined as a Cairn though it appears to be a Stone Construction and Ros which appears to be more of a heap of piled up Stones. Stone Monuments, which appears in Conway 1915, seems to be more in the Stone Construction category.
Reference: Conway 1915, Rogers 1985

MARKER ROCKS. Seemingly these are rocks in navigable waterways. They were marked by simple beacons and marks. Apparently the Aid upon the rock is the Aid rather than the rock in itself despite the overall name.
Reference: Naish 1985

PETIT ARBRE
Classification #: .26.261
Form of Aid: Marine Unlighted Beacon.
Operation: A simple and natural means of designating channel limits especially in shallow bodies of water subject to frequent channel movements. Sides of channel can be distinguished by tying down the branches on one side according to an agreed upon understanding.
Comments: IALA 1970 includes a representation of a small tree without a name since IALA claims there is no English term for such an Aid (though of course there is an English word for "tree"). Naish devotes considerable attention to early Aids under several names: Pricken (Dutch, German), a generic Birch Tree Beacon, and Withies (the more accurate English word). They all refer to the same phenomenon. Naish notes the use of Withies, etc. in snow-covered and treeless areas of Scandinavia. That form of the Aid suggests a Traffic Control Device (TCD). Topmarks of Twigs were also employed with Pole Beacons. Upright twigs in form of Besoms (Brooms) denoted one side of a channel and downward brooms denoted the opposite side. Classification also includes Small Tree which has a separate entry. Tree Branches are classified in separate entries.
Reference: IALA 1970, Naish 1985

PRICKEN. Dutch and German term for Tree and Tree Branch Daybeacons. The Netherlands refers to tree branches as perches with the tree in its natural state denoting port while trees with the branches tied down indicate starboard.

References: IHB 1956, IHB 1971, Naish 1985

SMALL TREE. This term appears in Parts C/D and Part H. It refers to an ancient practice of marking river channels.
Referemces: Parts C/D, H

TREE BRANCH. This term refers to Branches used to mark channels. Natural forms of Branches and Tied-down Branches denoted opposite sides of channels.
References: IHB 1956, Parts C/D, H

TWIG. A term listed in Part Iv. It is more likely this refers to a Topmark for Pole Beacon rather than an Aid in itself. See also Petit Arbre.
References: Naish 1985, IHB 1956

WITHY. English word for a tree branch or tree used to mark channels, etc.
Reference: Naish 1985

CHAPTER FOUR

FOG SIGNALS

4A INDEXES

Horn, Compressed-Air
Chime/Chime Signals
Air Chime Diaphragm
Horn, Chime Diaphragm/Horn, Diaphragm, Chime
Tyfon/Tyfon Horn/Tyfon Signal Apparatus/Tyfon Air Horn
Supertyfon/Supertyfon Air Horn/Supertyfon Air Signal/Supertyfon Fog Signal/ Supertyfon Horn/Supertyfon Signal/Two-Note Supertyfon/Leslie-Supertyfon Air Whistle

c) Diaphragm Fog Signals-Oscillator
Diaphragm Horn, Electric Oscillator Type
Diaphragm, Oscillator/Diaphragm (Oscillator)
Electric Air Oscillator/Air Oscillator
Electric Diaphragm Emitter/Electric Emitter/Electric Sound Emitter
Electric Fog Horn/Electric Fog-Horn/Electric Fog Signal
Electric Fog Signal Apparatus
Electric Horn
Electric Diaphragm Horns
Electric Signals
Electromagnetic Horn/(Electromagnetic Oscillator)
Emitter
ELU 500 Pure Tone Electric Emitter/ELU 800 Electric Emitter/Honeywell 800 HZ Signal/LIE 300 Signal/LIE 300 Electric LIE 300
Horn
Horn Buoy
Horn Diaphragm
Horn, Electromagnetic Oscillator
Horn, Oscillator
Lighted Horn Buoy
Low Power Electric Sound Signal/Low Power HF Electric Emitter
Nautophone
Oscillator
Pure Tone Electric Emitter/Pure Tone Signal
72-Tannoy-Speaker Electric Fog Signal
Triple Frequency Emitter Stack/Triple Frequency Fog Signal/Triple Frequency Electric Fog Horn/Triple-Frequency Fog Signal/Triple-Frequency Fog Horn

Reeds (4B4)
Reed Horn/Reed-Horns
Reed
Reed Fog Signal
Reed Signal
Air Trumpet
Barker Horn/Barker Reed
Daboll's Fog Horn/Daboll Reed/Daboll's Reed Signal/Daboll Reed Fog Signal/ Daboll's Rotating Trumpet/Daboll Trumpet
Equine Trumpet
Fog Trumpet
Hand Horn/Hand-Horn/Hand Fog Reed Horn/Hand-Pumped Reed Signal/ Holmes Hand Horn/Holmes Reed &Trumpet/Manual Reed Horn/Manual Reed/Norwegian Horn/Norwegian Portable Reed Fog Horn/Chance Brothers Hand Horn
High Pressure Reed
Service Reed
Stentor Reed/Stentor Horn

Sirens (4B5)
Siren
Siren Fog Signal/Siren Fog-Signal
Syren
Fog Siren/Fog-Siren
Fog Trumpet
Air Siren
Automatic Siren
Brown Siren
Brown Syren Trumpet
Cylindrical Siren
Disc Siren
Double-Siren
Double-Toned Signal
Electric Siren
High & Low Sirens
"Inch Sirens": 5-Inch Models/7-Models/Automatic 5-Inch Siren/5-Inch Siren/

5-Inch Automatic Siren/5-Inch Disc Siren/5-Inch Service Siren/Service 5-Inch Siren/Twin 5-Inch Siren/7-Inch Siren/7-Inch-Cylindrical Siren/7-Inch Diameter Siren/7-Inch Siren/7-Inch Cylinder Siren/7-Inch Diamter Siren/7-Inch Disc Siren/7-Inch Single-Note Siren/2-Note, 7-Inch Siren/12-Inch Siren/12-Inch Siren/12-Inch Diameter Motor-Driven Cylindrical Siren

Motor-Driven Sirens/Electric Motor Siren
"Note" Sirens: Automatic Two-Note Siren/High- & Low-Note Siren/7-Inch Single-Note Siren/Two-Note Siren/Single-Note Siren/Double-Noted Siren/2-Note, 7-Inch Siren
"Police Type" Siren
Port Siren
Rayleigh Trumpet/Rayleigh Siren
Secomark Siren
Service Siren
Single Automatic Siren
Siren Buoy
Siren Fog Signal/Siren Fog-Signal
Sireno/Sireno-O/Electric Sireno
Steam Siren/Steam-Siren/Steam-Powered Siren/Steam Syren

Percussion Signals (4B6)
Percussion Aids
Percussion Device

a) Bells
Aerial Bell
Automatic Bell
Automatically-Operated Fog Bell
Bell
Bell Boat/Bell-Boat/Bell-Ships
Bell Buoy/Bell-Buoy
Bell, Hand Operated/Bell, Gas/Bell, Electric/Electric Bell/Bell, Gravity--Clockwork
Brown's Bell-Buoy
Carillon Buoy
Clockwork-Operated Fog Bells

Compressed-Gas Bell Buoy
Double Bell Buoy
Fog Bell/Fog-Bell/Fogbell
Mechanically-Operated Fog Bells
Perpetual Fog-Bell
Wave-Actuated Bell
Wave-Actuated Buoy (Bell)

b) Gong, Combination and Miscellaneous Forms
Gong
Gong Buoy
Fog Gong
Lighted Gong Buoy
Steam Gong
Lighted Bell Buoy
Unlighted Bell-Buoy/Unlighted Bell Buoy
Drum

Whistles (4B7)
Whistle
Air Whistle/Air Fog Whistle
Automatic Buoy/Automatic Signal Buoy
Crosby Automatic Fog Signal
Courtenay's Whistling Buoy
Fog Whistle/Fog-Whistle
Lighted Whistle Buoy
Locomotive Whistle
Self-Acting Fog-Horn
Ship's Whistle
Six-Inch Whistle/Twelve-Inch Whistle
Sound Signal Buoy
Steam Fog Alarm
Steam Fog Signal
Steam Gong
Steam-Powered Whistles
Steam Whistle/Steam-Whistle/Steam Fog-Whistle
Steam-Whistle "Fog Alarm"

4A2 Alphabetical Index

4B1 Overarching Terms

Notes

A welter of terms have been employed as primary terms in these studies. Terms have been added from various agencies and publications that have also displayed versatility in choice of terms. In addition, the first edition of the T-M Database: Marine attempted to integrate the classification with the terms of the database entries. The Preface of that edition outlined some of the problems that were encountered in that attempted integration. However, there remains a need to integrate the classification and entries as well as achieve coherence among various terms. This edition employs one primary term for Fog Signals. But it also takes notes of major terms from various T-M studies as well as external sources. And it returns to the classification by encompassing major terms within a general classification term.

The main term will be Fog Signal. This term is accompanied by several affiliated terms as well as other terms that relate to Fog Signal. Two additional groupings of overarching and possible overarching terms complete the category. The first edition employed Fixed Fog Signal thereby differentiating fixed from floating forms. The variant classification employed both Fog Signal and Acoustical Signal. IALA uses Audible Aids as a general term. Yet other terms were favored by other sources. IALA distinguished between semiotic and physical aspects of Fog Signals by designating the former as Sound Signal and the latter as Fog Signal Apparatus (IALA uses Emitter as a term for specific mechanisms that create sounds). USCG has also employed Sound Signal but as a general term. Part Iv of the Database used Audible Aids as a general term. The classification numeration is 24 for Fog Signals that are of a fixed nature. And that will be used here for an overarching designation. Fog Signals on buoys are included though not the buoys themselves.

ACOUSTIC AIDS. This term from Part J may be a "homegrown term." A variety of terms were coined in Part J because of close to the proximity of terms from the several transportation modes. An attempt to find other sources on the internet came to little. Computer searches for terms of this nature churn up many entries

but few if any that are relevant.
Reference: Part J

ACOUSTICAL AIDS. A second such term. This became the basic term for Part Iv. Acoustical and Radio Aids shared a sub-chapter and possibly Aids from Radio Aids was thereby attached to Acoustical.
References: Part J, Part Iv

ACOUSTICAL SIGNAL. This term is apparently employed as a Fog Signal term only by UK 1861which is admittedly an early source. The term was included in this study before UK 1861 became available. This may suggest that the compiler transposed the term from readings in acoustics and adapted it as a Fog Signal through inadvertence. It represents a possible overarching term both from historic usage and from resonance with acoustics. It is the primary term for the variant classification.
Reference: UK 1861

AERIAL FOG SIGNAL. Putnam 1913 is seemingly the only user of this term. It designates signal emissions through the air which contrasts with signals transmitted through water.
Reference: Putnam 1913

AIR SIGNAL. This term refers to Fog Signals employing compressed air. It contrasts with Aerial Fog Signal which denotes signals transmitting messages through air rather than through water.
Reference: Renton 2001

ALARM SIGNAL. An informal term contributed by Langmaid. A possible overarching term though perhaps too general to have a specifically marine character.
Reference: Langmaid 1966

AUDIBLE AID. This term serves as the heading of Chapter 3 in IALA's *Dictionary*. However, the term is not listed, or defined, in the text.
Reference: IALA 1970

AUDIBLE SIGNAL. This term is seemingly employed by a single source. It is an possible overarching term though one finding little use. An attempt to locate further sources on the internet came to little since terms of this nature flood the internet though with few entries that are relevant.
Reference: Corbin 1926

AUTOMATIC FOGHORN. Corbin's term for a sea-activated Sound Buoy either Bell or Whistle Buoy. A possible overarching term.
Reference: Corbin 1926

COAST FOG SIGNAL. For the first edition only one surveyed source included this term. However it is included as the subtitle of Renton 2001 and, in turn, it appears in 19th century sources in his bibliography. It is possibly the equivalent of Major Fog Signals.
References: Johnson 1890, Renton 2001

COASTAL FOG SIGNAL. Renton also includes this form of the more basic Coast Fog Signal.
Reference: Renton 2001

COMPRESSED AIR SIGNAL. A Fog Signal whose mechanism is activated by the passage of compressed air. Renton employs the term with reference to a single Fog Signal type. While the term has little general use it retains the potential fior general usage.
Reference: Renton 2001

FIRST CLASS FOG SIGNAL. This term refers to a large full-scale unit rather than a smaller, limited unit at harbors.
Reference: Renton 2001

FOG HORN/FOG-HORN/FOGHORN. Fog Horn and variants are possible overarching terms. To an increasing degree it refers to Diaphragm, Electric Oscillator. See Also: Horn.
References: Adamson 1955 (Fog Horn, Fog-Horn); Kerchove 1961 and DeWire

1987 (Foghorn)

FOG SIGNAL/FOG-SIGNAL/FOGSIGNAL
Classification #: 24
Form of Aid: Marine Fog Signal
Comments: For the first edition of this study (1997) nearly half of the surveyed sources used this term. Fog Horn, and Sound Signal were also frequently employed; Horn also experienced greater usage. See General Note, and specific terms in this segment.
References: lst term: Conway 1915, Phillips 1949; 2nd term: McEwen 1953, Wryde 1913; 3rd term: Langmaid 1966

FOG SIGNAL APPARATUS. A term in IALA that describes the mechanism producing a fog signal (that is, the signal) though not defined.
Reference: IALA 1970

FOG SIGNAL APPLIANCE. A term from Hague and Christie that seemingly matches the meaning of Fog Signal Apparatus. The term refers to the mechanism that produces a given sound.
Reference: H & C 1975

FOG SIGNAL EMITTER. This term from IALA splits the sound processing apparatus from the produced sound. Many forms of Emitters are listed in IALA. The primary term for the Database is Sound Emitter. Subforms are listed under that heading. Fog Signal Emitter is an alternative for Sound Emitter. And the term is obviously related to the basic term of Fog Signal.
Reference: IALA 1970.

FOG SIGNAL STATION/FOG-SIGNAL STATION. An infrequently employed and variant term that probably indicates a free-standing Fog Signal unit where no Light is maintained.
Phillips 1949, APN 1918

FOG SIGNALLING/FOG-SIGNALLING. The term refers at least in part to machinery employed in Fog Signalling. The process of signal emissions is a

possible second meaning.
References: Renton 2001, TOOT 1981

FOG SIGNALLING DEVICE. Term refers to the apparatus for producing a distinctive sound.
Reference: Toot 1981

FOG WARNING SIGNAL. Smith 1971 offers this variant form of Fog Signal. It could be an overarching term though no other surveyed source included it.
Reference: Smith 1971.

GUIDING SIGNAL. This term from Edwards is an informal term of a vague nature. It could refer to a Lightship and/or to a Fog Signal aboard the Lightship.
Reference: Edwards 1884

HOOTER. IHB 2004 includes this term. The definition does not clearly indicate which Fog Signal types are included.
Reference: IHB 2004

HORN. This term is primarily found in Diaphragm Fog Signals. It is included here since it can have a broader meaning. IHB notes that a variety of forms are now known by that term.
Reference: IHB 2006

LONG-RANGE SIGNAL. A term that refers to a higher power units employed at coastal sites. It can be regarded as a Major Fog Signal.
Reference: Renton 2001

MAJOR FOG SIGNALS/MINOR FOG SIGNALS. USCG 1953 defined a Major Fog Signal as one with a range of 1.5 miles or greater. A minor Signal had a range of less than one mile. The terms can seen as parallels of the terms Major and Minor Lights.
References: USNOO 1969, USCG 1953

MARINE FOG SIGNAL. A plausible term that appears in Part J though not in

other sources for past T-M studies. Wikipedia includes the term along with Fog Signal and Railroad Fog Signal in a "technology stub."
References: Part J, Wikipedia

MEMBRANE HORN. A term from IHB 2004 that seemingly appears in no other source. It encompasses all Fog Signals employing a membrane including Nautophone, Reed and Typhon forms.
Reference: IHB 2004

OBSTRUCTION SIGNAL. According to USCG, the term term Sound Signal (Fog Signal) is not a reliable Aid to Navigation and therefore may better be termed an Obstruction Signal since that is increasingly its reduced role.
Reference: USCG 1973.

OCCASIONAL FOG SIGNAL. This term refers to a Fog Signal not in regular service during periods of fog. There is a single source for this term.
Reference: USNOO 1969

SECONDARY FOG SIGNAL. A somewhat vague term from Strobridge. It possibly refers to what USCG 1953 terms a Minor Fog Signal.
References: Strobridge 1974, USCG 1953

SHORT RANGE SIGNAL/SHORT RANGE ELECTRIC SIGNAL. These are terms for lower power units in harbor situations.
Reference: Renton 2001

SOUND BUOY. An overarching term for Buoys with a sound dimension. This general term is employed by few surveyed sources. Most Sound Buoy terms contain the the exact form of the sound mechanism (Gong Buoy, Bell Buoy, etc).
References: Adamson 1953, USCG 1959

SOUND EMITTER. IALA splits Fog Signal (semiotic sense) from Emitter. Emitter is the apparatus dimension. IALA includes a variety of Emitters though with the decline of many Fog Signal forms (as in a unified sense) the term Emitter often refers to Diaphragm Fog Signals. Other Emitter forms include Fog Signal

Emitter, Electric Sound Emitter, Mechanical Sound Emitter, Compressed-Air Emitter, Electrodynamic Sound Emitter, and Electromagnetic Sound Emitter. Fog Signal Emitter is listed separately from Sound Emitter.
Reference: IALA 1970

SOUND SIGNAL/SOUND-SIGNAL. IALA 1970 refers to this term in a semiotic sense: information transmitted rather than the apparatus. Yet other sources see it as apparatus or an assemblage of equipment and emitted sound. IALA 1970 discourages its use as apparatus while the USCG employs Fog Signal less and Sound Signal more in reference to apparatus. The meaning of the term as a physical unit is probably dominant among surveyed sources.
References: IALA 1970, Bowen 1947, Lighthouses-EB 1972, Sutton-Jones 1985

SOUND FOG SIGNAL. This term from TOOT here provides a more explicit form of Sound Signal which provides a general purpose term for Fog Signals.
Reference: TOOT 1981

SOUND SIGNAL BUOY. A rarely employed from a 19th century source that can serve as an overarching term for Buoys with sound mechanism. Bell Buoys and Whistle Buoys would have been in use in the late 19th century.
Reference: Kettle 1896

SOUND SIGNALLING DEVICE. This terms appear only in Renton. It is a very encompassing term for fog signals within a marine context.
Reference: Renton 2001

STEAM FOG ALARM/STEAM FOG ALARM STATION. These are possible over-arching or sub-overarching terms. Yet the specific context is the Steam Whistle invented by Foulis in the 19th century.
Reference: Brock 1974.

STEAM FOG-SIGNAL/STEAM FOG SIGNAL. A historic term as indicated by the addition of energy source to the term. A possibly overarching term and related to the core term of the study. It may refer to a Steam Whistle in Strobridge.
References: Johnson 1890, Strobridge 1974

STEAM-POWERED SIGNALS. In an earlier stage of development this term would refer to a limited number of Reed Signals, Siren Signals and Siren Signals.
Reference: Renton 2001

TRUMPET. This term may refer to the Reed Fog Signal. Though a possibly wider -- or at least a more vague -- meaning can be ascribed to it.
References: Johnson 1890, Renton 2001

4B2 Diaphone Fog Signals

DIAPHONE
Classification #: 2410
Form of Aid: Marine Fog Signal
Operation: Sound is produced through the moving of a slotted piston by compressed air or steam. Sound is akin to that of a Siren but produced by a piston rather than by a rotor.
Comments: The one-word term Diaphone has been employed by most surveyed sources. Accompanying entries include forms with a qualifying word(s).
Types: Diaphones came in a variety of types. Some sources list a variety of types including Renton who offers a broad range of types: A-Type/B-Type/C-Type/C-Type Diaphone/
F-Type/F Type Diaphone/Type-F Signal/Two-Tone F-Type, F2T/G-Type/ G-Type Diaphone/K-Type/Twin K Type Diaphone/L-Type/Twin K Type Diaphone
References: Wheeler 1986, DeWire 1987, Renton 2001

AIR DIAPHONE. This term has been employed by a single, older source. The energy source is frequently added to the core term by older sources. The energy source in this instance is compressed air.
Reference: USLHS 1918

DIAPHONE FOG SIGNAL/DIAPHONE FOG HORN/DIAPHONE SIGNAL/ DIAPHONE HORN. Some sources add qualifying terms to the core term. The added term(s) makes explicit that the mechanism is a Fog Signal though most sources are content with the core term.
References: DeWire 1995, Phillips 1949, Chadwick 1971

FIVE-INCH DIAPHONE. It is unusual to include the diameter for a Diaphone. This term refers specifically to Fog Signal tests in early 20th century.
Renton 2001

TWO-TONE DIAPHONE/DIAPHONE TWO-TONE. A Diaphone emitted two blasts, one high pitch, one low pitch. It seems to be regarded as an apparatus separate from the core Diaphone signal rather than a variant signal configuration of the Diaphone.
References: DMA 1993, USCG 1977

STEAM DIAPHONE. Since the energy source is added to the core term this suggests am early source. However, the source has proven difficult to locate.

VERTICAL DIAPHONE. A special form of the regular Diaphone. It was employed on some Lightships and isolated Fixed Lights in UK. It was presumably used because it required less space than the regular Diaphone with its horizontal trumpets.
Reference: Sutton-Jones 1985

4B3 Diaphragm Horns

a) Overarching Terms

DIAPHRAGM HORN
Classification #: 2411
Form of Aid: Marine Fog Signal
Operation: Sound is produced by movement of air through a diaphragm thereby creating vibrations.
Comments: Terms and resulting meanings are very complex for this form of Fog Signal. Diaphragm Horn is employed by numerous surveyed sources. The core term of Diaphragm finds some use. Diaphragm Fog Signal is also employed. With the decline in many forms of Fog Signals the more enclusive term of Horn finds increased usage. Horn, Diaphragm is occasionally utilized. Compressed Air and Oscillator each generate further terminology.
References: Adamson 1955, DeWire 1987

DIAPHRAGM. The unadorned term can possibly serve as the primary term of the diverse group of aids that make up Diaphragm Fog Signals. However, only a tenth of the surveyed sources for the lst edition so employed this term. Terms employing terms with an added qualifying term are more significant. The term encompasses electric, compressed-air and steam forms. Most remaining Fog Signals employ electric forms of Diaphragm and the terms Horn or Diaphragm Horn have come to dominate.
References: Bowen 1947, Wheeler 1990, Renton 2001.

DIAPHRAGM FOG SIGNAL A plausible overarching term though only Chadwick of the surveyed sources includes it.
Reference: Chadwick 1971

HORN. A term of confusion. Increasingly it is applied to Diaphragm signals of whatever form. In an earlier time it sometimes referred to the Reed Signal. It can be seen as a possible overarching term for Fog Signal though Fog Horn is a more likely candidate for that role. In many instances the term Horn is paired with another word (such as fog) thereby reducing the uncertainty over meaning. IHB notes that the UK Hydrographer employs Horn as a general term for many of the remaining active Fog Signal forms.
References: DeWire 1987, Chadwick 1966, IHB 2006

HORN, DIAPHRAGM. An alternate form of Diaphragm Horn. A single reference, USCG 1957, also includes a Horn, Diaphragm with a Low-Tone, and a High-Tone form encompassed in the term.
Reference: USCG LL PC 1957

b) Diaphragm Signals - Compressed Air

AIR HORN. An alternate term for several other Diaphragm, Compressed-Air terms. It is now obsolete.
Reference: USCG 1964

AIR DIAPHRAGM HORN/AIR-OPERATED DIAPHRAGM HORN/ DIAPHRAGM AIR HORN. The third entry is a general term for this form of Aid.

The previous terms from USCG are additional variations for the Aid. Electric versions superseded older air versions.
References: Renton 2001, USCG 1953

COMPRESSED-AIR (DIAPHRAGM) HORN. Only IALA 1970. uses this phrasing. The term presents a clear image of what the signal entails. Diaphragm Horn, Compressed-Air presents an alternate version.
Reference: IALA 1970

HORN, COMPRESSED-AIR. One of several terms or variants for the Diaphragm Horn, Compressed-Air.
Reference: USCG 1964

CHIME/CHIME SIGNALS. The Chime is a form of Diaphragm Signal. It consists of duplex or triplex units that work in unison thereby creating a chime sound.
Reference: Gibbs 1974, USCG 1957, USCG 1943

AIR CHIME DIAPHRAGM. Renton speaks of combining the diaphragm of Air Chimes brand Signals so as to create a chimes sound.
Reference: Renton 2001

HORN, CHIME DIAPHRAGM/HORN, DIAPHRAGM, CHIME. Alternative name for the Chime Aid. Even though the Chime can be viewed as a form of the Diaphragm it has a distinct identity of its own.
Reference: USCG 1977

TYFON/TYFON HORN/TYFON SIGNAL APPARATUS/TYFON/TYFON AIR HORN. Tyfon is a trade name that became a generic title for steam and compressed air Diaphragm Horns. Renton adds Air to the basic formulation.
References: IHB 1970, Renton 2001

SUPERTYFON/SUPERTYFON AIR HORN/SUPERTYFON AIR SIGNAL/ SUPERTYFON FOG SIGNAL/SUPERTYFON HORN/SUPERTYFON SIGNAL/TWO-NOTE SUPERTYFON/LESLIE-SUPERTYFON AIR

WHISTLE. Tyfon is included in in lst edition but not Supertyfon. Few sources included the latter term. One source, Leslie, did include Supertyfon which was viewed as a device using less air and displaying an ability to generate a more diverse variety of sounds. Renton 2001, by contrast, includes Tyfon and in variant forms. Supertyfon is not capitalized in Renton. USNOO 1969 viewed Tyfon as a UK usage.
References: Renton 2001, USNOO 1969

c) Diaphragm Fog Signals-Oscillator

DIAPHRAGM HORN, ELECTRIC OSCILLATOR TYPE.
Classification #:
Form of Aid: Marine Fog Signal
Operation: Sound created by electromagnetic oscillation of diaphragms.
Comments: This is the core term for this form of Aid. Since the first edition an expanded elimination of Fog Signals has ensued so that Electric followed by Emitter, Signal or Horn has become the name for most functioning Signals. This study includes new and old forms and more traditional terms continue to find use.
References: DeWire 1995, USCG 1964, USNOO 1971, Renton 2001

ELECTRIC FOG SIGNAL APPARATUS. This is admittedly a somewhat vague title. Its coinage and usage by Chadwick suggests a Diaphragm Oscillator unit. See also Electric Fog Horn, and Electric Fog Signal.
Reference: Chadwick 1971, Langmaid 1966

ELECTROMAGNETIC HORN/(ELECTROMAGNETIC AIR) OSCILLATOR. IALA presents these terms for the Diaphragm Horn, Electromagnetic Oscillator. The former is preferred in the UK while the latter is preferred in the US.
Reference: IALA 1970

HORN. An overarching term though increasingly it refers to Electric Horns of an oscillator nature.
Reference: IHB 2006

HORN BUOY. Seemingly only one source supplies this term. This may be an

overarching term (in the same sense that Fog Horn becomes a generic term for some authors) though probably it is a Diaphragm Horn in the oscillator form. The main entry is in the Buoy chapter of this study.
Reference: Tver 1987

HORN, DIAPHRAGM. An alternate term for the Diaphragm Horn. The single reference, USCG 1957, also includes a Horn, Diaphragm with a Low-Tone and a High-Tone system within the title.
Reference: 1957

HORN, ELECTROMAGNETIC OSCILLATOR. An alternate form for Diaphragm Horn, Electromagnetic Oscillator.
Reference: USCG 1964

DIAPHRAGM, OSCILLATOR/DIAPHRAGM (OSCILLATOR). These terms represent variant and alternate versions of the principal term of Diaphragm Horn, Electromagnetic Oscillator. Only limited surveyed sources include these terms.
References: Chadwick 1971, Langmaid 1966

HORN, OSCILLATOR. An alternate name for Diaphragm Horn, Electric Oscillator.
Reference: USCG 1953

ELECTRIC AIR OSCILLATOR/AIR OSCILLATOR. An older term from USCG 1953. Renton 2001 notes that Air Oscillator was a common name for older versions. These terms are in contrast to Electric Horns, Electric Emitters.
References: USCG 1953, Renton 2001

ELECTRIC DIAPHRAGM EMITTER/ELECTRIC EMITTER/ELECTRIC SOUND EMITTER. The first edition (1994-1997) spoke of Electric Diaphragm Emitter as a somewhat generic replacement for the older term of Diaphragm Horn, Electromagnetic Oscillator. It noted that with the decline of the Fog Signal this general and generic term took on a technical meaning for the one form of Fog Signal employed to a substantial degree. Renton's work published in 2001 takes the matter further and frequently employs even more general terms that have

become species-specific and technical terms.
References: H & C 1977, Sutton-Jones 1985, Renton 2001

ELECTRIC FOG HORN/ELECTRIC FOG-HORN/ELECTRIC FOG SIGNAL. These terms lack mention of Diaphragm terminology yet they are probably of that mode; though admittedly usage of terms can vary among sources. With the falling off in use of Fog Signals any mention of electric-powered Signals are very likely to be Diaphragms. Langmaid distinguishes between two forms: Nautophones and the Electric Fog-Horn. The Nautophone is of a high-pitched character while the other term has multiple emitters and of a medium-pitch.
References: Langmaid 1966, USCG 1953

ELECTRIC HORN. Renton 2001 seemingly employs this term as a synonym for Electric Emitter. He notes that early forms of Electric Horns or Electric Emitters were frequently termed Air Oscillators.
Reference: Renton 2001

ELECTRIC DIAPHRAGM HORNS. A variant form of the same Electric Emitter or Electric Horn.
Reference: Renton 2001

ELECTRIC SIGNALS. A term that can be expansive and elusive on a computer search engine yet has a specific and technical meaning in a marine context. It is another form of Electric Diaphragm Horn.
Reference: Renton 2001

EMITTER. A nearly minimalist term that may not suggest a Fog Signal yet it too has a technical meaning for the dwindling category of Signals.
Reference: Renton 2001

ELU 500 PURE TONE ELECTRIC EMITTER/ELU 800 ELECTRIC EMITTER/ HONEYWELL 800 HZ SIGNAL/LIE 300 SIGNAL/LIE 300/ELECTRIC LIE 300. This group of terms refer to advanced and high-powered emitters with accompanying brand names.
Reference: Renton 2001

LIGHTED HORN BUOY. The nature of the sound mechanism for this Buoy is unclear but presumably it represents a Diaphragm Horn, Oscillator. There is seemingly no unlighted form. The principal entry is found in Buoys of this study.
Reference: USCG 1991

LOW POWER ELECTRIC SOUND SIGNAL/LOW POWER HF ELECTRIC EMITTER. These are descriptive terms for short-range Signals. They are probably not formal names.
Reference: Renton 2001

NAUTOPHONE. This signal has a puzzling aura about it. It is included in DMA, IHB, UK records and some navigation dictionaries but IALA and many sources in the literature pass over it. It is a Diaphragm signal operating on electricity with a sound akin to the Reed. It is possibly a predecessor to the Oscillator (or an older name for that Aid). It may be acceptable to see the Diaphragm as divided into steam and air versions (Tyfon) and electric oscillator (Nautophone) versions. At times the Nautophone becomes a synonym for Diaphragm Signals in general. USCG 1953 offers a precise notion of the Nautophone: the Nautophone is a small version of "Single frequency" (single unit/single diaphragm) Oscillators.
References: USCG 1953, Admiralty 1952, Langmaid 1966, USNOO 1991, DMA 1993, IHB 1970

OSCILLATOR. A type of Fog Signal that involves oscillation of diaphragms by electromagnetic processes. The Signal is known by a variety of names.
References: Kerchove 1961, McEwen 1953

PURE TONE ELECTRIC EMITTER/PURE TONE SIGNAL. These Signals are named after the nature of the sound that is produced. A pure tone sound is one that is unmodulated.
References: Wheeler 1990, Renton 2001, Pharos Marine.

TRIPLE FREQUENCY EMITTER STACK/TRIPLE FREQUENCY FOG SIGNAL/TRIPLE FREQUENCY ELECTRIC FOG HORN/TRIPLE-FREQUENCY FOG SIGNAL/TRIPLE-FREQUENCY FOG HORN. These UK

Signals were comprised of production units that created three frequencies for the resulting sound. Different Fog Signals emitted variant versions of the three frequency message.
Reference: Renton 2001

72-TANNOY-SPEAKER ELECTRIC FOG SIGNAL. This represents one form of Triple Frequency Signal produced by the Tannoy Company.
Reference: Renton 2001

4B4 Reeds

REED HORN/REED-HORN
Classification #: 2403
Form of Aid: Marine Fog Signal
Operation: The reed sound is produced by the vibrating of a steel reed by compressed-air or steam. The resulting sound exits through and is shaped by a trumpet.
Comments: Reed Horn and Reed-Horn can be considered as the core term for this form of Aid. Reed alone is a strong alternate. The core term and alternate was employed by about 40% of surveyed sources for the first edition. Other terms include Reed Signal, Reed Fog Signal, Reed Trumpet (several forms).
References: McEwen 1953, Sutton-Jones 1985, Floherty 1942, Wryde 1913, USNOO 1971, EB 1910

REED. This term found frequent use in surveyed sources though Reed Horn was more often employed in older sources. It can be noted that this Aid was already in an obsolescent state by the early 1950s.
References: Adamson 1955, Langsmaid 1966, Bowen 1947, McCormick 1936

REED FOG SIGNAL. A term employed by IALA but rarely by other sources. It may have been used in order to distinguish Reed as Fog Signal from the world "reed" when referring to the tongue of such apparatus.
Reference: IALA 1970

REED SIGNAL. This term is included by a few sources who are often of early

vintage.
References: A Few Notes 1910, Phillips 1949, Corbin 1926

AIR TRUMPET. Seemingly only Strobridge includes the Reed under this title. This signal is horse-powered and may refer to the Equine Trumpet which see.
Reference: Strobridge 1974

BARKER HORN/BARKER REED. This is a type of Reed Fog Signal employing multiple reeds.
Reference: Renton 2001

DABOLL'S FOG HORN/DABOLL REED/DABOLL'S REED SIGNAL/ DABOLL REED FOG SIGNAL/DABOLL'S ROTATING TRUMPET/DABOLL TRUMPET. The first edition of this study included a single term under Daboll. However, Renton 2001 includes many forms of the Daboll which are added here. The name Daboll can be part of the official name while in other instances it simply refers to the inventor of the Signal. It is a Reed Signal which includes a rotating trumpet. UK Admiralty LL 1966 referred to it as Daboll's Fog Horn which begins this entry.
References: DeWire 1995, Johnson 1890, Renton 2001

EQUINE TRUMPET. Only DeWire so names this horse-powered Trumpet though others describe it.
Reference: DeWire 1995

FOG TRUMPET. This term refers to the Daboll Trumpet.
Reference: Renton 2001

HAND HORN/HAND-HORN/HAND FOG REED HORN/HAND-PUMPED REED SIGNAL/HOLMES HAND HORN/ HOLMES REED & TRUMPET/MANUAL REED HORN/MANUAL REED/ NORWEGIAN PORTABLE REED FOG HORN/NORWEGIAN HORN/ CHANCE BROTHERS HAND HORN. The many sources for the 1st edition included two forms of a manually-operated Reed Signal. Both were supplied by Wryde 1913. However, Renton 2001 includes a plethora of forms. Differences may be found

among the terms but their manual character is common to all of them.
References: Renton 2001, Wryde 1913

HIGH PRESSURE REED. This is probably a descriptive name. Trinity House Service Reeds operated on low pressure. High Pressure units generated a superior sound though more expensive to operate.
Reference: Renton 2001

REED TRUMPET. A term employed only infrequently and not recently. Trumpet alone is a more common and early term for a Signal employing a reed tongue.
Reference: Putnam 1913, Wheeler 1990, Calahan 1960

SERVICE REED. A term employed by Renton. In an e-mail he explains the use of the term for Service Siren. Such an Aid is the "in-house" siren employed by the aids to navigation service agency, Trinity House. Hence, Service Siren. The term and rationale can be applied to the Service Reed as well.
Reference: Renton 2007

STENTOR REED/STENTOR HORN. A 19th century Signal produced by the Pintisch Company.
Reference: Renton 2001

4B5 Sirens

SIREN.
Classification #: 2404
Form of Aid: Marine Fog Signal
Operation: Steam, compressed-air or electricty activates a disk (with slits) or a rotor (cup-shaped) thereby creating a distinctive sound.
Comments: Sound is somewhat similar to a Diaphone (which is a reciprocating siren) though means of production is different. The basic term of Siren was employed by most surveyed sources for the first edition.
Terminology: Alternate overarching terms include Syren, Siren Fog Signal and Siren Fog- Siren. Fog Siren and Fog-Siren are also alternatives. More specialized terms can also be encompassed within Siren and the classification designation.

References are numerous. They include IALA 1970, Bowen 1947

SIREN FOG SIGNAL/SIREN FOG-SIGNAL. Many sources refer simply to Siren but occasionally sources add Fog Signal to the core term and thereby increasing the explicit character of the term.
References: Chadwick 1971, Johnson 1890

SYREN. An alternate form employed by Corbin 1926. WTID describes "Syren" as a British variant of Siren. OED notes it use by Tyndall in 1879 (Syren and Syren-Trumpet). Neither EB 1911 nor Wryde 1913 employ the term.
Reference: Corbin 1926, OED 1933, Vol X, WTID

FOG SIREN/FOG-SIREN. A plausible Overarching term yet a term only infrequently included in surveyed sources.
References: Holland 1972, Floherty 1942

FOG TRUMPET. UK Admiralty referred to an Aid with the meaning of Siren under this heading. It displayed a large Trumpet as well. Though Trumpet was more often a generic name for Reed Signals.
Reference: Renton 2001

AIR SIREN. Older Aids often included the energy source in the title. In this instance a relatively new term also added the form of energy.
References: USLHS 1918, USCG 1964

AUTOMATIC SIREN. This term refers to a Siren in which the production of air drove a cylinder thereby creating sound from the beginning of the cycle. Sound emissions were of an ascending order. This is in contrast to Motor-Driven Sirens in which air is not present until the Signal is fully operational.
Reference: Renton 2001

BROWN SIREN. Term refers to Signal produced by A & F Brown, a New York manufacturer.
Reference: Renton 2001

BROWN SYREN TRUMPET. Does the term refer to a complete Signal or merely the Trumpet? Sirens for this mechanism were of the disc form and motor-driven. A UK installation as can be seen by British spelling.
Reference: Renton 2001

CYLINDRICAL SIREN. A term for a type of mechanism that is incorporated in the name. A rotating cylinder employed in producting sound rather than a disc.
Reference: Renton 2001, Wheeler 1990

DISC SIREN. Early Sirens were often of a disc form. Passage of compressed steam through the disc generated a distinctive sound.
References: Renton 2001, Wheeler 1990

DOUBLE-SIREN. Term refers to two Sirens in one installation. They generated two notes and were louder and more distinctive in sound produced.
Reference: Edwards 1884

ELECTRIC SIREN. Many Sirens were powered by compressed-air or steam though in time some became powered by electricity. There is an apparent confusion between the Electric Siren and the Sireno which is also an electric-powered apparatus.
Reference: USLHS 1918

HIGH & LOW SIRENS. Term may be more of a descriptive name than an official name. This Siren emitted two notes in alternating fashion.
Reference: Renton 2001

"INCH" SIRENS: 5-INCH MODELS/7-INCH MODELS:
AUTOMATIC 5-INCH SIREN/5-INCH SIREN/5-INCH AUTOMATIC SIREN/ 5-INCH DISC SIREN/5-INCH SERVICE SIREN/SERVICE 5-INCH SIREN/TWIN 5- INCH SIREN/7-INCH SIREN/7-INCH CYLINDER SIREN/7-INCH DIAMETER SIREN/7-INCH DISC SIREN/7- INCH MOTOR-DRIVEN SIREN/7-INCH MOTER-DRIVEN DISC SIREN/7-INCH SINGLE-NOTE SIREN/2-NOTE, 7- INCH SIREN/12-INCH SIREN/12-INCH DIAMETER MOTOR-DRIVEN CYLINDRICAL SIREN. Some sources include the diameter

of the Siren in their narratives. This is especially true of Renton 2001. It is not clear if the dimension is generally part of the official name. Possibly there are cases in which it is though in other cases the detail of dimension is not part of the name.
Reference: Renton 2001

MOTOR-DRIVEN SIRENS/ELECTRIC MOTOR SIREN. The form of operation is included in title. A motor-powered mechanism revolved until the correct speed reached then air applied to rotor thereby creating the desire sound. The second term is akin to the first.
Reference: Renton 2001

"NOTE" SIRENS.
AUTOMATIC TWO-NOTE SIRENS/HIGH- & LOW-NOTE SIREN/7-INCH SINGLE-NOTE SIREN/TWO-NOTE SIREN/SINGLE-NOTE SIREN/ DOUBLE-NOTED SIREN/2-NOTE, 7-INCH SIREN. Some sources include descriptive information in the title of the Aid or adjacent to the title. Data about notes is one form of such information. It is unclear when the information is actually part of the name, and when it provides details but is not part of the name.
Reference: Renton 2001

"POLICE TYPE" SIREN. There is no signal with this name. However, one source USCG 1964, differentiates between standard Sirens and those with a rising/falling pitch akin to police sirens. Because of that difference in apparatus and in the resulting sound this term has been coined to denote what is, in effect, a separate Aid.
Reference: USCG 1964

PORT SIREN. Term refers to Siren employed in early 20th century Fog Signal trials. Does it refer to small Signal for harbors and ports? Or to the ports in a Signal mechanism?
Reference: Renton 2001

RAYLEIGH TRUMPET/RAYLEIGH SIREN. Rayleigh's work centered on the designing of Trumpets for aiding sound emissions. Sirens or reeds were placed

within the Trumpet. The term seemingly can refer to the full Signal apparatus.
Reference: Renton 2001

SECOMARK SIREN. Secomark was a company that produced a variety of Fog Signal types in UK. All forms were air-driven.
Reference: Rento 2001

SERVICE SIREN. This term refers to the "in-house" Siren of the aids to navigation service. In this case the service is that of Trinity House. See also: Service Reed.
Reference: Renton 2007

SINGLE AUTOMATIC SIREN. This may not be a formal term. But it does describe the working on the Siren which produces two notes within a single mechanism.
Reference: Renton 2001

SIREN BUOY. There is a single reference to this Aid. No details are given. Electric Diaphragm Signals have been employed on Buoys but Siren Buoys are largely unknown.
Reference: Gibbs 1974

SIREN FOG SIGNAL/SIREN FOG-SIGNAL. General terms for the Siren Fog Signal though not often employed. The second comes from Edwards.
References: Edwards 1884, Renton 2001

SIRENO/SIRENO-O/ELECTRIC SIRENO. Many older Sirens were compressed-air or steam operations. The Sireno was electric powered instead. Wheeler 1987 opines that Sireno became a generic term as did Tyfon/Typhon became a generic term for the Diaphragm. However, USLHS 1918 maintained both Sirenos and Electric Sirens. Wheeler offers a second formulation of the name (Siren-O) and USLHS 1918 suggests a third form with Electric Sireno.
References: Wheeler 1987, USLHS 1918

STEAM SIREN/STEAM-SIREN/STEAM-POWERED SIREN/STEAM SYREN.

Older Signals often included the energy source with the title of the Aid of which the Steam Siren is an example.
References: Wheeler 1990, DeWire 1995

4B6 Percussion Signals

PERCUSSION AIDS. There is probably no Fog Signal by this name. However the term provides an encompassing term for Bells and Gongs that operate on a percussion principle. USCG 1953 offers a tripartite subdivision of air, electric and percussion units. The Classification does not include this term or provide a classification number. Though both are needed.
Reference: USCG 1953

PERCUSSION DEVICE. It can serve as an overarching term for all forms of Percussion Aids.
Reference: Renton 2001

PERCUSSION SIGNALS. This term appears in the lst ed of this publication. It served as the overarching term for these forms of Aids. Source, if any, not identified.
Reference: Part Ii, lst ed.

a) Bells

AERIAL BELL. Putnam 1913 used this term to distinguish Bells sounding in air from those sounding under water.
Reference: Putnam 1913

AUTOMATIC BELL. This refers to fixed Fog Signals operated automatically as opposed to manually-operated forms. This Aid is possibly of a clock-work form.
Reference: Langmaid 1966

AUTOMATICALLY-OPERATED FOG BELL. The first portion of the name may be a description of method of operation rather than a formal name. The specific Aid may have been operated by acetylene gas.

Reference: Renton 2001

BELL.
Classification #: 2401
Form of Aid: Marine Fog Signal
Operation: Bells in fixed forms are activated by bell striker or weights; floating forms generally by wave action. Striking of bell striker, clapper or tapper causes vibrations in the form of audible energy.
Comments: Some electronic generated bell simulators are also in use. Other terms within the category include Fog Bell, Bell Buoy, and Lighted Bell Buoy.
Reference: Wheeler 1990,

BELL BOAT/BELL-BOAT/BELL-SHIPS. There are few references to this Aid. It was apparently a short-lived 19th century entity consisting of a small unattended boat with a somewhat large bell. It is also listed in the Floating Aids segment of the Database. Bell-Ships is an apparent synonym supplied by Smith.
References: Adamson 1953, Smith 1971

BELL BUOY/BELL-BUOY. Buoys are primarily members of the Floating Aids segment of the Database. Bell Buoys are wave-actuated in operation: a bell hung from the superstructure of the Buoy is activated by several tapers hung from the same superstructure through movement of the sea.
Reference: IALA 1970

BELL, HAND OPERATED/BELL, GAS/BELL, ELECTRIC/ELECTRIC BELL/BELL, GRAVITY--CLOCKWORK. USCG 1953 listed Bell Signals by means of propulsion. They are listed in a standard government pattern. The first and second-named were listed as obsolete in 1953 though not the third form.
Reference: USCG 1953.

BROWN'S BELL-BUOY. A historic term from an early form of Bell-Buoy. In this form the bell is mounted in the bottom of the Buoy and a carefully positioned cannon ball slams against the bell when activated by the action of the sea. A curious entity but relatively common in the later 19th century.
Reference: Johnson 1890

CARILLON BUOY. This Buoy is primarily a member of Floating Aids part of the Database. This Buoy is found only in France and consists of a group of bells instead of the more common single bell with multiple tapers.
Reference: IALA, 1970, French STPB

CLOCKWORK-OPERATED FOG BELLS. An early form of mechanical bell operation later replaced by gas or electric powered Bell Strikers.
Reference: Renton 2001

COMPRESSED-GAS BELL BUOY. Langmaid is the only surveyed reference for this Marking. It is akin to Gas Buoys and Gas-Lighted Buoys which also includes the energy source in the name though this is in a sound form.
Reference: Langmaid 1966

DOUBLE BELL BUOY. A historic term included only by Wheeler 1986. It is the forerunner of the Gong and emitted a sound similar to the Gong.
Reference: Wheeler 1986

FOG BELL/FOG-BELL/FOGBELL. A large majority of Bells are simply listed under the term Bells. But about twenty-five per-cent of the surveyed sources for the lst ed refer to Fog Bell or a variant of the same.
References: Adamson 1955, McEwen 1953

MECHANICALLY-OPERATED FOG BELLS. These can include any form of mechanism for sounding a Bell. The specific form here is a device that operated hammers periodically striking the bell.
Reference: Renton 2001

PERPETUAL FOG-BELL. A historic name and Aid from the early 19th century. The Bell was activated by tidal energy that wound up a weight system that periodically rang the bell.
Reference: Strobridge 1974.

WAVE-ACTUATED BELL. This term for Renton refers to a bell equipped buoy

rather than a Fixed Aid.
Reference: Renton 2001

b) Gong, Combination and Miscellaneous Forms

FOG GONG. Quite simply, a Gong employed as a Fog Signal. DeKerchove also includes the term though seemingly for ship-board use.
References: USNOO 1969, DeKerchove 1961

GONG
Classification #: 2402
Form of Aid: Marine Fog Signal
Operation: The sound was created by a hammer hitting flattened discs of metal known as gongs.
Comments: The Gong was of Chinese provence and even of Chinese manufacture. They were employed on UK Lightships. Most Aids employing are Floating Aids.
Reference: Sutton-Jones 1985, McCormick 1936, IALA 1970

GONG BUOY
Classification #: 14.152
Form of Aid: Marine Fog Signal
Operation: Sound created by a hammer hitting flattened discs of metal known as Gongs.
Comments: Gong Buoys were established only in the 1920s and are a relatively rare Aid.
References: Kerchove 1961, DeWire 1987

LIGHTED GONG BUOY. This Aid is a Gong Buoy accompanied by a light.The principal entry for this Aid will be found in the Floating Aids chapter.
Reference: USCG 1991

UNLIGHTED BELL BUOY/UNLIGHTED BELL-BUOY. One source, USCG 1959 referred to the Bell Buoy without a light in this manner. Most sources note the presence of a lighted dimension to a Sound Buoy but not the absence. A

primary entry in the Floating Aids chapter.
Reference: USCG 1959, Weiss 1926, Wheeler 1990

DRUM. A rare Aid employed in now extinct Turkish Lightships. Islamic doctrine forbade the use of Bells. Drums were therefore substituted.
Reference: Edwards 1884

4B7 Whistles

WHISTLE
Classification #: 2400
Form of Aid: Marine Fog Signal
Operation: A sound created by movement of steam or compressed-air through an aperture in the whistle body. Wave-actuated Whistle Buoys have a somewhat different mode of operation though the basic principle is similar.
Comments: Wheeler 1995 notes that "Whistle" has, at times, been employed as an all-encompassing name for Fog Signals. Some manufacturers have used the word to describe what are really Diaphragm Horns. See Whistles (Misnomers); also Air, Steam Whistles.
References: Langmaid 1966, Wheeler 1990, Wheeler 1995, IALA 1970

AIR WHISTLE/AIR FOG WHISTLE. Older sources often attached the form of energy to the type of Signal. This particular form was powered by compressed-air. The term has more recently been employed in a misnomer sense: some makers of Diaphragm Horns, Compressed-Air refer to their product as an Air or Steam Whistle which it is not. Strobridge includes a form with a more explicit title that includes the word "fog".
References: Weiss 1926, Strobridge 1974.

AUTOMATIC BUOY/AUTOMATIC SIGNAL BUOY. These are terms in Kettle 1896 that refer to the Courtenay Whistling Buoy which see.
Reference: Kettle 1896

CROSBY AUTOMATIC FOG SIGNAL. Only Johnson 1890 mentions this term. It apparently refers to an alternate system of motive power for the Steam-Whistle

and thereby a motive power unit rather than an actual Fog Signal.
Reference: Johnson 1890

COURTENAY'S WHISTLING BUOY. Courtenay invented an early -- if not the earliest -- version of this Aid which was named after him. Few sources include mention of this entity.
Reference: EB 1911, Wheeler 1986

FOG WHISTLE/FOG-WHISTLE. An alternate name employed by a few sources. Holland 1972 -- one of those sources -- often adds "Fog" to the type of Aid.
Reference: Holland 1972

LIGHTED WHISTLE BUOY. This is a Whistle Buoy accompanied by a light. The principal entry for all Floating Aids is located in that section of the Database.
Reference: USCG 1991

LOCOMOTIVE WHISTLE. A few sources list this as a Fog Signal. It is a historic form. Early versions may have been actual Locomotive Whistles (or ship whistles) while other forms were similar though distinct entries.
References: Talbot 1913, Wheeler 1990

SELF-ACTING FOG-HORN. Corbin's name for a Whistle Buoy.
Reference: Corbin 1926

SHIP'S WHISTLE. Renton notes that this term comes from an earlier era in which such a Whistle was a steam-generated whistle. The term continues in use but it now refers most often to an Air Horn. Renton also notes that a clear difference between the ship's whistle and a fog signal is no longer clearly manifested.
Reference: Renton 2001

SIX-INCH WHISTLE/TWELVE-INCH WHISTLE. It is not clear whether "6-inch" and "12-inch" are part of the name or whether it provides detail to the basic term. This is true of many terms. Renton adds details or creates more precise terms for many Aids including Whistles.

Reference: Renton 2001

STEAM FOG SIGNAL. A vague term from Strobridge 1974. Since its reference is to the later 19th century it may refer to a Steam Whistle since that was a primary form of steam-activated signal.
Reference: Strobridge 1974

STEAM GONG. A type of Marine Fog Signal. An apparently rare signal. It is a double Steam Whistle and thereby a variant form of the Steam Whistle.
Reference: A Few Notes 1910

STEAM-POWERED SIGNALS. In an earlier stage of development this term would refer to Reed Signals, Siren Signals and a limited number of Whistles.
Reference: Renton 2001

STEAM WHISTLE/STEAM-WHISTLE/STEAM FOG-WHISTLE. A moderately common term for Whistle especially in older sources. About one-third of surveyed sources included the term.
Reference: A Few Notes 1910

STEAM-WHISTLE "FOG ALARM". Renton seemingly is referring to the Steam-Whistle or Fog Alarm of Robert Foulis. The term Steam Fog Alarm is included with Overarching Terms.
Reference: Renton 2001

STEAM-WHISTLE FOG SIGNAL. A plausible overarching term for all Steam-Whistles though rarely employed.
Reference: Renton 2001

UNLIGHTED WHISTLE BUOY. This term accurately describes the Buoy in question though it is a relatively rare term. Buoys with Light and Whistle incorporate both terms in the title. But an Unlighted Whistle Buoy is most often simply termed a Whistle Buoy.
Reference: Tver 1987, USCG 1959

VERNON-SMITH WHISTLE. This Whistle was invented by Robert Foulis in Canada in the 19th century. However, it is known as the Vernon-Smith Whistle.
Reference: Edwards 1884

WAVE-ACTUATED BUOY WHISTLE. "Wave-actuated" can be part of the name or an addition of detail to the basic term. It is also possible that it constitutes the name for a specific author.
Reference: Renton 2001

WHISTLE (Misnomer). Some manufacturers refer to Diaphragm, Compressed-Air Signals as Air or Steam Whistles. This is not correct since those entities possess a diaphragm mechanism. There are, of course, true Whistles. Federal Signs notes the misuse of term problem; Leslie is an example of the practice with its SUPERTYFON AIR WHISTLE and TYFON STEAM WHISTLE.
Reference: Federal Signs, Leslie

"WHISTLE". Renton places Whistle in quote marks to denote Aids produced by Secomark that are of an Air Horn character but known as a "Whistle." Possibly the sound bore a degree of resemblance to the Whistle.
Reference: Renton 2001

WHISTLE BUOY
Classification #:
Form of Aid: Marine Floating Aid
Operation: Air within a tube -- which is attached to the buoy body -- compressed by action of the sea and thereby activating a whistle mounted at the upper end of the tube.
Comments:
Reference: IALA 1970

WHISTLING BUOY/WHISTLING-BUOY. An alternate name for Whistle Buoy; older references often employ it.
References: Conway 1915, Johnson 1890, Holland 1972

EXPLOSIVE SIGNALS.
General Comments. The Explosive Signals group contains a variety of entries of which only a limited part contain the word "Explosive" in their title. The group can be divided into Explosive Signals under that name along with Cannon, Guns, Acetylene Gun and Rockets. In the first edition Signals containing the word Explosive were not quite a quarter of the terms for the category. Nearly one-third of the terms included Gun. Yet Explosive served as a general term for this diverse group since explosive sounds are common to most of the group.
Classification #: 2412
Form of Aid: Marine Fog Signal
Operation: The specific form of Explosive Signal often consists of a "Tonite" charge hung from a jib arm activated by an electric detonator.
Comments: Not only are there major differences between the terms in this over-arching term but there are differences between actual Explosive Signals. Most of the latter involve individual explosive charges.

ACETYLENE FOG GUN/ACETYLENE FOG-GUN/ACETYLENE GUN/ AUTOMATIC ACETYLENE GUN. These terms are alternative terms for the Gas Gun which see.
References: Bowen 1947, Langmaid 1966, Talbot 1913

AUTOMATIC FOG GUN. Only Kerchove 1961 includes this term. It is a possible reference to the Acetylene Fog Gun since that Aid is automatic even to the point of finding employment on Buoys.
Reference: Kerchove 1961

BREECH-LOADING GUN/EIGHTEEN-POUNDER GUN/ HOWITZER/ MUZZLE-LOAD GUN/. Various forms of artillery pieces were employed for earlier Fog Signals. The terms in this entry represent some of those Aids.
References: Renton 2001, Wheeler 1990

CANNON. This may afford a synonym for Gun. It would seem that Gun has superseded the term Cannon though, admittedly, both are probably archaic.
Reference: H & C 1977

CARRONADE. A relatively small cannon named after a manufacturing works in England. Their deployment included Lightships.
References: Renton 2001, Wheeler 1990

CLOCKWORK EXPLOSIVE FOG SIGNALS. Term refers to a clockwork mechanism that moved a Tonite charge into contact with electrical charge thereby activating a charge.
Reference: Renton 2001

EXPLOSIONS. This is seemingly an overarching term though the source indicates the major name is the Gun. The term is a noun in this usage.
Reference: APN 1938

EXPLOSIVES. An overarching term in Renton. For Parts C/D it included all non-Gun/Cannon Aids.
Reference: Renton 2001, Parts C & D

EXPLOSIVE CHARGE. The term was employed by a few older references. This term is possibly the equivalent of Explosive Signal and may have involved a Tonite charge.
References: McCormick 1936, Putnam 1913, EA 1960

EXPLOSIVE EMITTER. This may have been employed only in UK. It is possibly a term coined to encompass the remaining Signals that involve explosives of whatever form.
References: UK MoD 1993

EXPLOSIVE COAST FOG SIGNAL. Presumably the term refers to Signals on the coast which may be the equivalent of Major Fog Signals in USCG 1953.
References: Renton 2001, Edwards 1884

EXPLOSIVE FOG SIGNAL/FOG EXPLOSIVE SIGNAL/FOG EXPLOSIVE/ EXPLOSIVE SOUND SIGNAL. The first term is employed only by IALA 1970; presumably coined to more clearly indicate that this explosive device is a Fog

Signal. However, the principal term for the Database is Explosive Signal. Wryde 1913 offers two presumably variant forms. The last-named variant is provided by Kettle 1896.
Reference: IALA 1970, Wryde 1913, EB 1910, Kettle 1896

EXPLOSIVE JIB. This refers to a mechanical apparatus to which an explosive charge was attached. Perhaps it is not an complete Signal though it remains a major component.
Reference: Renton 2001

FOG CANNON. This is quite possibly an alternative for Cannon. The addition of "Fog" makes explicit the nature of the Aid. One source, Holland 1972, often adds "Fog" to Fog Signals forms that otherwise often lack that term.
Reference: Holland 1972

FOG GUN/FOG-GUN/FOG-SIGNAL GUN. An alternate name for the Fog Signal oftern termed simply Gun. Only a few sources include these variant forms.
Reference: Bowen 1947

GAS EXPLOSIVE GUN. This term includes the Acetylene Gun but presumably can include all Explosive Signals that employ gas.
Reference: Renton 2001

GAS GUN FOG SIGNAL/GAS GUN/ACETYLENE GAS GUN. An Aid that created an explosion by mixing of acetylene gas with air. This mixture was ignited by a spark producing device. It was a short-range Aid. Various terms appear to refer to this Signal and its process of operation.
Reference: Renton 2001, Bowen 1947, Corbin 1926, Sutton-Jones 1985

GUN/GUN SIGNAL. Guns, Cannons, and related terms constitute slightly over half of Explosive Signals. However, they are also older and more often obsolescent/obsolete Aids. Guns remain listed in DMA light lists. The term can be seen as the core term for this form or sub-form of Fog Signal. Related terms include Fog Gun, Fog-Gun, Cannon and Fog Cannon. Langmaid supplies the variant form of Gun Signal.

Reference: DMA 1995, Langmaid 1966

MOYES GUN. This terms refers to a type of Acetylene Gun.
References: Bowen 1947, Renton 2001

RADIO-CONTROLLED ACETYLENE GUN. This is a possibly self-explanatory term. Remote control of the process for creating a spark was accomplished by remote control through a radio connection. See also: Gas Gun.
Reference: Renton 2001

ROCKET. Few sources include this Aid. This Signal is not found in IALA, DMA, UK MoD and other common sources. It is probably archaic. The Rocket was viewed by some as an improvement over the Gun since launched projectiles exploded in mid-air thereby creating a visual as well as an acoustic message.
Reference: Talbot 1913

SOUND-ROCKET/SOUND ROCKET. Terms are offered only by Wryde 1913 and Kettle 1896. Adding of "sound" adds to the Fog Signal character of the Aid.
References: Wryde 1913, Kettle 1896

SPECIAL GUN/EXPERIMENTAL GUN. This refers to a specially designed gun with a "parabolic muzzle". It was designed to display improved acoustics and thereby improve volume of sound. The use of the Gun was short-lived. The Experimental Gun of Corbin refers to the same Signal.
References: Renton 2001, Corbin 1926

TONITE EXPLOSIVE SIGNAL. This term was included by Sutton-Jones. It is possibly an informal term or a description of the Aid rather than a formal name.
Reference: Sutton-Jones 1985

4B9 Submarine Signals

FESSENDEN OSCILLATOR. This Signal used a diaphragm oscillator rather than a bell. Signals transmitted far beyond the range of older Signals. It could transmit in Morse Code and had value as a general communication system.

Reference: Fay 1963

SUBMARINE SIGNALS. These Fog Signals are located underwater. Sound travelling through water tends to be more reliable than sound released into the air. This term constitutes the overarching term for this form of Aid.
References: Kerchove 1961, Weiss 1926

AUTOMATIC SUBMARINE SIGNAL. This term refers to a Submarine Bell attached to a Buoy that includes a mechanism for ringing a bell through the motion of the sea.
Reference: Corbin 1926

SUBMARINE BELL/SUBMARINE-BELL
Classification #: 24.33
Form of Aid: Marine Fog Signal
Operation: Underwater Bell activated via cable from Lightship or Buoy.
Comments: A pre-oscillator underwater Aid that transmitted a clear, consistent message to mariners. A shipboard receiver enhanced reception. It displayed a fixed message characteristic in contrast to seabourne Aids. Wryde provides an alternative term by the second term.
References: Corbin 1926, Wryde 1913, USNOO 1971

SUBMARINE FOG-BELL. A variant term for Submarine Bell.
Reference: Wryde 1913

SUBMARINE FOG SIGNAL. An overarching term that can encompass all forms yet rarely employed.
Reference: de Kerchove 1961

SUBMARINE OSCILLATOR/OSCILLATOR
Classification #: 24.34
Form of Aid: Marine Fog Signal
Operation: The Oscillator is a form of diaphragm device affixed to hull of Lightship which broadcasts signals through the water.
Comments: Reception was improved through the use of shipboard receiver. The

Submarine Bell and Submarine Oscillator are predecessors of Sonar. Both are listed by DMA though a obsolescent Aid. Strobridge 1974 refers simply to Oscillator but it has the meaning of Submarine Oscillator not a Diaphragm Aid.
References: Fay 1963, Chadwick 1971, DMA 1983, Strobridge 1974

SUBMERGED BELLS. Johnson 1890 employs this term which seems to be the equivalent of Submarine Bell.
Reference: Johnson 1890

SUBMARINE SIGNALLING/SUBMARINE SIGNALLING SYSTEM. This is a general term encompassing Submarine Signals of an Aids to Navigation nature as well as ship communication systems. Corbin 1926 notes three Aids to Navigation forms: a compressed-air version from a Lightship; a sea-bed form hung from a tripod and connected by cable to a Lighthouse (there was apparently a Lightship version as well); and finally, a sea-activated form hung from a Buoy. Renton includes a version that adds "System."
Reference: Corbin 1926, Renton 2001

SUBMARINE SOUND SIGNALS. An overarching term for this form of signal; only few surveyed sources include it.
References: McEwen 1953, USNOO 1969

UNDERWATER BELLS. Langmaid's version of Submarine Bell terminology.
Reference: Langmaid 1966

UNDERWATER OSCILLATOR. Smith 1971 provides this alternate for the Submarine Oscillator.
Reference: Smith 1971

UNDERWATER-SIGNALS. Overarching term for Oscillator and Underwater Bells; equivalent of Submarine Sound Signals or Submarine Signals.
Reference: Langmaid 1966, Fay 1963

ECHO BOARD. This Aid can be termed a passive Fog Signal. The Aid consisted of large boards set at sharp angles. The sounding of a ship's whistle generated significant echoes which determination of position.
Reference: Putnam 1933; older USCG Light Lists.

NATURAL FOG SIGNAL/NATURAL FOG-SIGNAL./NATURAL SOUND-WARNING. UK 1861 refers to the sea birds on South Stack as forming a "natural signal ... ."
Reference: UK 1861

NATURAL SIGNALS. This term from Adams also refers to bird noises at South Stack Light that served as a Fog Signal. Renton refers to the Signal in his work as well.
Reference: Adams 1870, Renton 2001

PISTON HORN/ELECTRIC PISTON HORN. A Fog Signal produced by Secomark. The sound bore some resemblance to emissions from Sirens and Diaphones. It was listed under the name Diaphone on occasion.
Reference: Renton 2001

TALKING BEACON. A Fog Signal assemblage involving a Diaphone and radio transmission of a recorded message which permitted mariners to determine position.
Reference: Renton 2001

CHAPTER FIVE

RADIO AIDS

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General Comments: There are a variety of terms that could service as the core term for Marine Safety Aids employing radio waves. These include Electronic Aids to Navigation, Radio Aids to Navigation, Radio Aids to Navigation or Maritime Navigation, Electronic Navigation Aids, Radio Navigation/Radio Navigation Aids, Navigation Aids, Electronic or Radio Navigation Systems, Maritime Navigation Systems.

Some sources prefer Electronic Aids to Navigation as an overarching term. It is admittedly a more inclusive term. But electronic devices without radio waves are frequently shipboard devices and therefore not Safety Aids. It is therefore flawed because of its inclusivity. The older term of Radio Aids to [Marine/Maritime] Navigation or the variant forms of Radio Aids or Radio Navigation Aids seem preferable. A few sources speak of Electronic Navigation Systems or Radio Navigation Systems but those terms are also vague and easily include non-Safety Aid Devices.

Marine Safety Aids often include a recognized title for the various subdivisions (for example, Fog Signals, Daybeacons) but Radio Aids to Marine Navigation seemingly does not. A perhaps curious development has taken place in which the "parent" term of Aids to Marine Navigation is combined with either "electronic" or "radio" in order to create a divisional title. Radio Aids is a possible alternate yet it is too inclusive to be a fully adequate term.
Reference: Kemp 1976

ELECTRONIC AIDS TO NAVIGATION. This is a possible overarching term. But because it is more inclusive than Radio Aids to Navigation or to Marine Navigation it may also include shipboard devices with or without radio aids that are not Safety Aids to Navigation as defined in this Monograph Series. The term can also include Aero Aids. It is therefore overly inclusive and inadequately mode-specific.
Reference: Douglas-Young 1987, Chadwick 1971

ELECTRONIC NAVIGATION AIDS. This is a variant of the previous term.

Both terms include Radio Aids but they are too broad to be an adequate substitute for Radio Aids to Marine Navigation.
Reference: Douglas-Young 1987

ELECTRONIC NAVIGATION SYSTEMS. A possible overarching term for Marine Radio Aids yet more vague. The comments on the two previous terms apply here as well. This term is included since it appears in the literature.
Reference: Hobbs 1990

GROUND-BASED NAVIGATION AIDS. A term from Hofmann-Wellenhof that differentiates traditional Aero Aids from newer Aids that are Satellite-Based. It also appears in a source for Part Iiv as well as a related term, Ground-Based Radio Aids.
Reference: Hoffmann-Wellenhof 2003; Komons 1978, Wilson 1979

MARINE NAVIGATION SYSTEMS. A possible overarching term for marine Radio Aids though it may be overly broad and inclusive. The source for the term, Cutler, is a general electronics source rather than a more specifically marine A/N reference.
Reference: Cutler 1986

NAVIGATION AIDS. A term applied to Radio Aids but it is overly general and inclusive. This is true of previous terms as well.
Reference: USNOO 1969

NAVIGATIONAL AIDS. While this term is not interchangeable with Aids to Navigation in the US it is so in the UK. The term therefore refers to Aids to Navigation in some of the literature. It refers more often to vessel-based electronic devices in the US.
Reference: USNOO 1969

POSITION FIXING SYSTEMS. A possible "sub-overarching" term that can encompass many marine Radio Aids including Radiobeacons, Hyperbolic Aids, Satellite Navigation.
Reference: Bole 1992

RADIO AIDS. A basic term for Radio Aids to Marine Navigation though in a short form. The longer term constitutes the basic and core term for the Database.
References: IALA 1970, Bowen 1947

RADIO AIDS TO MARINE NAVIGATION. A term employed as the basic overarching designation for Marine Radio Aids. However, few sources include it. One English source, Kemp, includes the term. And the term is a mainstay of Canada's Fisheries and Oceans agency for this form of Aid.
References: Kemp 1976, Canada F & O 2006

RADIO AIDS TO MARITIME NAVIGATION. This is a possible core term for marine Radio Aids. It can be seen as a nuanced variant to Radio Aids to Marine Navigation.
References: IHB 1965

RADIO AIDS TO NAVIGATION. A possibly core term though not overly mode-specific. A more adequate term would include "Marine".
References: IHB 1966, USNOO 1969

RADIO NAVAIDS. Term appears in Part Iiv but it can apply to Marine Aids as well. Part J includes the term without a specific reference.
References: Blanchard 1990

RADIO NAVIGATION AIDS/RADIONAVIGATION AIDS. These are further permutations of the basic term of Radio Aids, and perhaps more contemporary terms. Radio Aids to Marine Navigation remains the more adequate term.
References: Weik 1969, ICAO 1985

RADIO NAVIGATION SYSTEMS/RADIONAVIGATION SYSTEMS. A possible overarching term for marine Radio Aids. While it is an overly inclusive term it is included in the Database since it is present in the literature.
Reference: Hobbs 1990

RADIO NAVIGATIONAL AIDS. This term is the title of a DMA publication which refers in large part to Radio Aids to Marine Navigation. Perhaps the

addition of the word "radio" alters "navigational aid" into an Aid to Navigation term.
Reference: USNOO 1969

5C Radiobeacons

5C1 Overarching Terms

BEACON. This is a term that may appear too general to include here yet Beacon does include Radiobeacons and can therefore refer to that Aid. On occasion the two terms are synonyms. USNOO 1969 regards the various forms of the Radiobeacon as a major segment of Beacon.
Reference: USNOO 1969

FIXED NON-DIRECTIVE MARINE BEACON. This term approximates that of Marine Radiobeacon. Keen notes that its purpose is similar to Lighthouses and Landmarks.
Reference: Keen 1938

INVISIBLE LIGHTHOUSE. Corbin 1926 offers this as an early term for Radiobeacon or Wireless Beacon. The term may have been coined to contrast with visible Lighthouses.
Reference: Corbin 1926

MARINE RADIOBEACON. This would seem to be the basic term for Radiobeacons but seemingly few sources so regard it. The term manifests precision that the core terms lack.
References: USCG 1977

MARITIME RADIO BEACON. Hoffman-Wellenhof add "Maritime" to the basic term. This may have been done because of the close proximity of marine and aero terms in their work.
Reference: Hoffman-Wellenhof 2003

OMNIRANGE/OMNIDIRECTIONAL RANGE. These are terms that refer to

Aids to Navigation that give magnetic bearings of that Aid (Omnibearing) to a receiver from any direction. Some Radiobeacons, including Omni-Radio Beacons, Omnidirectional Beacons, and Radio Range, are memberS of that category.
Reference: USNOO 1969

RADIOBEACON/RADIO BEACON/RADIO-BEACON/RADIO BEACON STATION/RADIOBEACON STATION.
General Comments: The Radiobeacon is the oldest form of Radio Aids to Marine Navigation. It is a declining form of Aid though still employed. Newer forms of Radio Aids are the subject of international agreements and are standardized at least to some extent. But Radiobecons have been less encumbered of restraints and have a longer history which has led to many forms and titles. Types and terms include: Radiobeacons (as one word; two words; hyphenated), Directional and Nondirectional, Continuous, Continuous Carrier, Omnidirectional, Marker, Marine, Circular, Rotating, Radiophare, Omni, Circular, Wireless, Equisignal, and Radio Fog Signal. The term Marine Radiobeacon has few users. IALA adds "Station" to Radiobeacon though with the same meaning.
Classification #: 2500
Form of Aid: Marine Radio Aid to Marine Navigation
Operation: A single station LF/MF Aid whose signals provide bearing information to vessels equipped with radio direction finders. It is essentially the radio equivalent of a Lighthouse.
References: IALA 1970, USNOO 1969, Bowditch 1966, APN 1928

RADIO BEACON FOG SIGNAL. A possible overarching term yet only one surveryed source included it.
Reference: Phillips 1949

RADIO FOG SIGNAL/RADIO FOG-SIGNAL. This is a Radiobeacon operating exclusively during periods of restricted visibility. It is also possibly an older usage that defines the Radiobeacon as a Fog Signal. Wireless Fog Signal is allied with this term. Strobridge 1974 offers a hyphenated form.
References: Kerchove 1961, Strobridge 1974

RADIOPHARE. An alternate name for Radiobeacon. A single surveyed source

uses the term. Henney, in a more encompassing work, applies it to Aero Navigation Aids in place of Nondirectional Beacons (NDBs), the aero equivalent of Marine Radiobeacons.
References: Bowen 1947, Henney 1959

WIRELESS BEACON. An alternate name for Radiobeacon.
Reference: Kerchove 1961

WIRELESS FOG SIGNAL/WIRELESS LIGHTHOUSE. These are early names for the Radiobeacon. The names reflect the idea that the Radiobeacon was the radio equivalent of the sound Fog Signal or even Lighthouse. Wireless Fog Signal is a near synonym for Wireless Beacon though the latter may have a broader meaning. Corbin offers Wireless Lighthouse as an variant form.
Reference: Kerchove 1961, USCG-O'Brien 1983, Corbin 1926

5C2 Radiobeacon Main Forms

a) Directional Forms

COURSE BEACON. A single surveyed source so labels the A-N Radio Range for marine usage. The A-N Radio Range is more often an Aero Aid yet some some sources include a marine usage.
Reference: IALA 1970

DIRECTIONAL FINDING BEACON/DF BEACON. A term of possible confusion: Distance Finding Stations are composite radio/sound Aids but this term, as included by Appleyard, refers to Radiobeacons and constitutes an overall term for that Aid. The term can also be confused with Radio Direction Finding Stations.
Reference: Appleyard 1986

DIRECTIONAL BEACON/DIRECTIONAL RADIOBEACON/DIRECTIONAL BEACON (RADIO RANGES)/DIRECTIONAL RADIO BEACON. This term refers to a Radiobeacon transmitting in one or more specific directions. A common form emits an equisignal pattern of which the A-N Radio Range (which

dates back to early aero practice) is a frequently employed form.
References: IHB 1965, USNOO 1969, IALA 1970

b) Non-Directional Forms

NON-DIRECTIONAL RADIOBEACON/(NON-DIRECTIONAL) RADIOBEACON. An alternate name for the Circular Radiobeacon. IALA places "Non-Directional" within parantheses.
References: Maloney 1985, IALA 1970

CIRCULAR RADIOBEACON/CIRCULAR BEACON. This form emits signals simultaneously in all directions. The Circular Beacon is a variant term for Omni-Directional Beacon.
References: Kerchove 1961, USNOO 1969, IHB 1966

MARINE NONDIRECTIONAL BEACON. "Marine"is added to the basic term by Williams. The proximity of aero and marine wordings may have caused that practice.
Reference: Williams 1992

c) Rotating Forms

REVOLVING RADIOBEACON. An alternate name for the Rotating Radiobeacon which see.
Reference: Maloney 1985

ROTATING LOOP RADIOBEACON. This term refers to a form of Radiobeacon that employs a rotating loop transmitter with directional capabilities. Direction finding equipment is not required for receiving the signals; any receiver able to receive that frequency can obtain the signals.
Reference: USNOO 1969

ROTATIONAL PATTERN RADIOBEACON. Presumably this is a variant name for the Rotating Radiobeacon.
Reference: Sonnenberg 1980

ROTATING RADIOBEACON/ROTATING BEACON. A Radiobeacon in which radio signals are emitted in a revolving manner according to an azimuth pattern. The emissions can be viewed as an analogue of light energy emissions at some Lighthouses.
Reference: Maloney 1985

d) Composite Forms

OMNIDIRECTIONAL BEACON. This type of Radiobeacon transmits in all directions. Rotating Beacons and Circular Beacons are two forms of it.
Reference: USNOO 1969

OMNI-RADIO BEACON. A term for a Radio Beacon that emits signals in all directions. Types include Rotating Beacons, Circular Beacons, Omnirange, Omnidirectional Beacon.
Reference: Bowen 1947

5C3 Other Forms of the Radiobeacon

AERO RADIO BEACON. This may be a dubious term for the marine part of the Database. Yet some light lists (e.g., UK) include such Aids in coastal areas when of benefit to marine navigation.
Reference: Sonnenberg 1980

AEROMARINE RADIO BEACON. Term refers to dual use Radiobeacons listed in some Light Lists including those of the Admiralty and therefore relevant for this study.
Reference: Sonnenberg 1988

AUTOMATIC RADIOBEACON. A term in Part Iv that came from Part J. However, it refers to the beginning of automatic operation of Radiobeacons rather than an Aid formally known as an automatic Aid.
References: Part Iv, Part J, O'Brien 1983

CALIBRATION STATION. This Aid is a special Radiobeacon, or a regular

Radiobeacon that transmits special signals so that mariners can calibrate ship-based radio direction finder equipment.
References: Bole 1992, USCG 1962

CLASS A, -B, -C RADIOBEACONS. These terms refers to the distance that classes that Radiobeacon transmissions could be heard at reliable distances. "A" class could be heard up to 200, "B" 100 miles, and "C" 20 miles.
References: O'Brien 1983, Part J

COASTAL BEACON. Part J is the source of a variety of terms that are extrapolations or interpretations from other sources. Some of the resulting terms are uncertain in nature while others are coined terms that differentiates terms from different modes that are in close proximity. This term refers to Radiobeacons employed in marine and coastal situations.
References: Part J, FRP 1990

EQUISIGNAL BEACON. Term refers to a Radiobeacon that transmits equi-signal patterns. Such pattern consists of two signals of equal power. A single undifferentiated signal is encountered if on the beam but a single differentiated signal (perhaps an "A" or "N" in Morse Code) if off the beam (one to the left, another to the right).
References: IHB 1965, USNOO 1969

MARKER RADIOBEACON/MARKER BEACON/MARKER/RADIO-MARKER BEACON. These are low powered Radiobeacons at harbor and entrance areas. They are essentially homing beacons and often lack individual identification characteristics. The shorter names are variants of the full name. The last-named Aid is from Strobridge.
References: USNOO 1969, Strobridge 1974

QTG SERVICE/RADIO STATION WITH QTG. An uncertain term for the Database. It refers to the practice in the UK and other nations of using a non-Marine Radiobeacon station for producing the equivalent of a Radiobeacon signal upon request.
References: Sonneberg 1988, Bole 1992

RADIOBEACON BUOY. Term refers to a Buoy with a Marker Radiobeacon attached to it and positioned at a channel entrance.
Reference: USNOO 1969

RADIO COMPASS SIGNAL/RADIO COMPASS STATION. Alternative terms for the Radio Directional Finder Station.
Reference: Maloney 1985, APN 1928

RADIO DIRECTION FINDER STATION. Navigation agencies of some nations maintain Radio Direction Finder (RDF) Stations at shore locations. Upon request of mariners these stations will determine ship bearings and relay that data by radio. They are also known as Radio Compass Stations.
References: Maloney 1985, Sonnenberg 1988

SECONDARY RADIO AIDS TO NAVIGATION. This appears to be a general, overarching term. Yet the reference in Strobridge suggests it refers to a Marker Radiobeacon. Radiobeacons and Secondary Radio Aids are virtually synonyms since the reference is from the 1930s.
Reference: Strobridge 1974

SHORT-RANGE RADIOBEACON. A variant term for Marker Beacon? It refers to Radiobeacons on UK Lightships. The Aid provided an indicator to nearby ships that a Lightship was close by.
Reference: Chadwick 1971

VHF RADIO LIGHTHOUSE BEACON. A special UK Aid with application to small craft with limited receiver equipment. The signal is a Rotating Beacon using VHF and a telephone receiver on a specified channel will receive the signal which follows Morse code characteristics.
Reference: Sonnenberg 1988

5C4 Character of Operations Forms

CONTINUOUS CARRIER RADIOBEACON. Term for a Radiobeacon whose

carrier is unbroken though modulated by the identification message.
Reference: IALA 1970

CONTINUOUS RADIOBEACON. This form refers to a Radiobeacon that transmits continuously and which operates on a frequency that is not shared.
Reference: USCG 1977

DUAL CARRIER RADIOBEACON. A variant form of the Continuous Carrier Radiobeacon. A second carrier frequency provides identification for the unit.
Reference: IALA 1970

GROUP SEQUENCE STATION. Presumably an alternative title for a Sequenced Radiobeacon Station. These radiobeacons share a frequency through a time-sharing arrangement.
Reference: Dutton 1985

SEQUENCED RADIOBEACONS. A group of Radiobeacons that share a common frequency and alternate signal emissions according to a timesharing plan.
Reference: USCG 1977

5D Hyperbolic Forms

5D1 Overarching Terms

HYPERBOLIC RADIONAVIGATION SYSTEMS/HYPERBOLIC RADIO-NAVIGATION SYSTEMS.
Classification #: 252
Form of Aid: Marine: Radio Aid to Marine Navigation
Operation: These Aids send out radio waves that become hyperbolic Lines of Position (LOP) when the transmission time arrivals from two or more synchronized transmitting stations are measured. The received signals remain constant on a hyperbola with the transmitters acting as foci and the time determination places the receiver on the hyperbolic LOP. A second set of transmitters creates a second LOP, and the intersection of the two LOPs provides a

navigational fix.
Comments: Major Hyperbolic Aids include Decca and Loran. Consol and Raydist arepartly hyperbolic and partly radial; they are considered in an accompanying subdivision. Omega, Toran, Rana, Raydux and POPI constitute a third category of Aids under the heading of single and near-single forms. The inclusion of some terms can be questioned. These terms are included for one of several reasons: se they overlap marine and aero transportation modes, or they are aero devices that may find use in marine navigation, or they may be hydrography or surveying devices that can affect marine navigation.
References: Parts C/D, Part J.

HYPERBOLIC AIDS/HYPERBOLIC NAVIGATION SYSTEMS/ HYPERBOLIC SYSTEMS. The term "Hyperbolic Aids" may have no official standing but it does provide a convenient variant title for this aspect of Radio Aids. McGraw-Hill 1992 refers to Hyperbolic Navigation Systems which can also serve as an alternate. Hyperbolic Systems may appear to be overly inclusive yet Blanchard employs it as a term in his Aero Aids writing.
References: Part J, McGraw-Hill 1992, Blanchard 1991

5D2 Decca Aids

DECCA
Classification #: 2631
Form of Aid: Marine: Radio Aid to Marine Navigation
Operation: Decca is a hyperbolic system that employs continuous wave transmissions and phase comparison measurements. Each unit has a master station and two to three slave stations. The stations broadcast a continuous wave (cw) signal at different frequencies but that are interlocked through frequencies which follow a fixed ratio to one another. Measurement consists of determining wave length arrival differences on a phase meter ("Deccometer").
Comments: Decca is privately-owned and seemingly the only major Radio-navigation System in that category.
References: USNOO 1969, Hobbs 1992, Henney 1959

DECCA CHAIN. This term can be viewed seen as describing the physical

facilities of a given Decca operating unit. Decca itself refers to a system of radionavigation producing LOPs that can translate into a navigational fix.
Reference: USNOO 1969

DECCA NAVIGATOR/DECCA NAVIGATOR SYSTEM/DECCA NAVIGATOR CHAIN. These terms represent fuller names for Decca. The last named term combines Decca Navigator and Decca Chain.
References: Henney 1959, IALA 1970, Langmaid 1966

DELRAC= DEcca/Long/Range/Area/Covering. A phase comparison, very low frequency, highly accurate system that provides area coverage rather than track coverage; it is also a long distance system.
References: Grover 1957, Williams 1992

DECTRA. This system is part of the Decca Company and a derivative of Decca. A very accurate, long range directional Aid largely intended for the North Atlantic. Dectra is an acronym for Decca Track and Range. The Aid is primarily an Aero Aid though a smaller marine usage is possible. Airborne meters indicates whether the craft is left or right of the track as well as the distance travelled. The lanes of Dectra provide prefixing for tracks. Dectra employs Decca lanes along with the added feature of lanes paralleling the tracks.
Reference: Grover 1957

DECTRA CHAIN. This term encompasses the physical facilities that make up a given Dectra operating unit. The core of Dectra itself refers to a system of radio-navigation producting LOPS and that leads to navigational fixes.
Reference: USNOO 1969

HI-FIX. This is a Decca radio navigation system employing lightweight portable units. It has both hyperbolic and range forms. Two variant versions are Mini-Fix and Sea-Fix.
References: USNOO 1969, IALA 1970

LAMBDA/DECCA LAMDA. Lambda is formed from Low Ambiguity Decca. It is a phase comparison system employed in hydrography that provides position

fixes. Transmitter and receiver are shipbased with two slaves stations on land. Distance measuring of signals in the system leads to a position fix. Decca Lambda is an alternative name (as is Two-Range Decca which see).
Reference: IALA 1970

MINI-FIX. A form of Hi-Fix, a Decca system, that utilizes lightweight and automatic units. See also: Hi-Fix.
Reference: USNOO 1969

QM. This term was the official designation for Decca during testing and development in the 1940s.
References: Kemp 1976, Buck & Pierce 1947

SEA-FIX. A form of Mini-Fix employing lightweight, portable, automatic equipment mounted on buoys. Mini-Fix, in turn, is a form of Hi-Fix, a Decca system.
Reference: USNOO 1969

TRUNK-ROUTE DECCA. An alternate name for Dectra which provides navigation tracks on long-range trunk routes.
Reference: USNOO 1969

TWO-RANGE DECCA. An alternate name for Lambda.
Reference: USNOO 1969

5D3 Loran Aids

CHAIKA/CHAYKA. These Russian terms refer to a hyperbolic navigation system similar to Loran. It was developed by the former USSR. "Chaika" can be translated as "Seagull." Signals are virtually interchangeable with Loran, and, in fact, a joint operation was created in Alaska. Chayka is an alternate spelling for Chaika.
References: Kayton 1990, USCG 1964

CYCLAN. The earliest stage of what became Loran-C was known as Cyclan..

The earliest efforts began in the early 1940s but not until 1944 did work begin on a LF Loran form. That early effort did not prove to be workable. New work began on Cyclan but it did not achieve the desired long-range coverage. However, aspects of the earlier development were to be part of the future Loran-C.
References: USNOO 1959, USNOO 1969

CYTAC. According to USNOO, Cyclan was the designation for Loran-C in the earliest forms. Cyclan was replaced by Cytac and became a partial predecessor of Loran-C. USCG 1964 does not include Cytac and indicates less of a connection between Cyclan and Cytac.
References: USNOO 1959, USNOO 1969

DIFFERENTIAL LORAN-C. Term for an experimental local and corrected version of Loran-C for harbor and entrance areas. Some employment of the Aid took place. But further use was unlikely in the light of GPS and DGPS developments. This is a non-Satellite Aid. See Also Satellite DGPS.
Reference: Maloney 1985, Hoffmann-Wellenhof 2003

ELECTRONIC POSITION INDICATOR (EPI). A term for a Radionavigation System that is a LF form of Shoran and appears in the Radar group as well as in Hyperbolic Aids. The Aid was employed for long distance hydrographic work. IALA views it as a Loran system though of a radar form.
Reference: IALA 1970, USNOO 1969, Bowditch 1966

GEE. A UK system of a hyperbolic nature developed in World War II. It was similar to Loran (the systems were simultaneously developed and equipment could be interchanged). GEE was a short to medium range Aid while Loran was long range. GEE operated at higher frequencies than Loran, and it allowed for two LOPs while Loran operated on one. GEE required many chains to cover large areas which was a significant drawback.
References: Hall 1947, Bowditch 1966, USNOO 1969, Williams 1992, Dutton 1958

HF LORAN/H.F. LORAN. HF Loran is a later name for the system known simply as Loran. Loran-A was the eventual name for that system.

Reference: Williams 1992, R.A. Smith 1948

HYPERBOL. For a time Germany employed GEE under the name Hyperbol.
Reference: Bowditch 1966

LORAN.
Classification #: 2520
Form of Aid: Marine Radio Aid to Marine Navigation
General Comments I: Loran designates a group of Radio Position Fixing Systems. The development of earlier forms took place during World War II. The forms include Loran A through E. Alternate and earlier names included HF Loran, LF Loran and SS Loran. Related and antecedent Aids included Cyclan, Cytac, GEE and Hyperbol.
General Comments II: Principles of opration include radio signals in pulse form, emissions by two or more transmitters, and shipboard equipment that measures signal arrival differences which leads to LOPs.
References: IHB 1966, USCG 1964

LORAN CHAIN. This term describes the physical facilities that make up a given Loran operating unit.
Reference: IALA 1970

LF LORAN/L.F. LORAN/LOW FREQUENCY LORAN/LOW-FREQUENCY LORAN. This is a late World War II form of Standard Loran (later Loran-A) that employed LF rather than MF. This resulted in lower accuracy because of the pulse length; compensating factors partially corrected that problem.
Reference: Henney 1959, Buck & Pierce 1947, Casabona 1959, R. A. Smith 1948

LORAN-A. A hyperbolic MF device with pulse envelope matching of transmitted signals. Both ground and sky waves are employed. Loran-A was formerly known as Standard Loran. It is largely obsolescent though some usage was continued by Chines and Japanese fisherfolk into the 1990s.
References: USCG 1964, IHB 1956, USNOO 1969, Henny 1959, Kayton 1990

LORAN-B. A non-current form using LF transmissions. It is possibly related to

World War II LF Loran. It employs the same frequency as Loran-A but it is more accurate since it utilizes both envelope matching and cycle matching (within the envelope). IHB saw it as of possible value in harbor and entrance areas.
References: USCG 1964, IHB 1956

LORAN-C
Classification #: .422
Form of Aid: Marine: Radio Aids to Marine Navigation
Operation: An LF hyperbolic device with multiphase transmissions containing eight pulses per transmission (and a ninth for station identification). Phase coding is a feature of transmissions; pulse and pulse groups change according to a sequential pattern. Time difference measurement of signal arrivals lead to a LOP and two LOPs create a navigation fix.
Comments: Loran-C stations consist of a master station and two to four slave stations. Loran-C has long base lines and long distance capabilities. It is now a somewhat obsolete Aid.
References: USCG 1964, IALA 1970

LORAN-D. This is a portable form of Loran-C which has been employed for military operations.
Reference: Kayton 1990

LORAN-E. A non-current MF/HF system employing skyway synchornization or matching or both. This system was developed in the late period of World War II but no frequency allocation was available for it. It appears to be identical to SS Loran.
Reference: USCG 1964

LORAN SYSTEM. IALA employs the term as the general term for the Loran group. A variety of other sources simply refer to Loran when referring to the group of Aids under the appellation of Loran.
Reference: IALA 1970

SS LORAN/S. S. LORAN/SKYWAVE SYNCHRONIZED LORAN. A World War II system of long range capability and long base lines. It employed skywave

synchronization. In 1957 letter designators were assigned to Loran forms. It seems probable that Loran-E represents SS Loran since Loran-E, a MH/HF system, employs envelope matching with either skywave synchronization or match or both. SS Loran was intended for night-use only. Skywaves were used at night and groundwaves during the day.
References: USCG 1964, Henney 1959, Williams 1992

STANDARD LORAN. An older name for what became known as Loran-A.
Reference: USCG 1964

5D4 Hyperbolic Systems-Single & Near-Single Forms

DIFFERENTIAL OMEGA. A system of stations that emit a corrected form of Omega data for coastal navigation. Omega itself is accurate for open sea navigation but less so for close-in navigation.
Reference: USCG 1983

OMEGA
Classification #: 2522
Form of Aid: Marine: Radio Aid to Marine Navigation
Operation: Hyperbolic Aid in VLF range (9-14 kHz) which emits CW signals. Eight stations which operate on time-shared arrangements provide world-wide coverage. Phase comparison of cw transmissions lead to determination of LOPs.
Comments: Similar to Decca in operation except that any two available stations can provide data. Omega became obsolete in 1997.
References: USCG 1983, Hobbs 1981, FRP 1992, FRP 1999, Fink 1982

POPI=Post Office Position Indicator. A World War II era system commissioned by the UK Post Office. It was of a hyperbolic nature and employed a CW phase comparison system. It is similar to Decca though it used shorter base lines and displayed more lineal LOPS. It is infrequently mentioned in the literature.
Reference: Henney 1959

RADUX. This is a LF hyperbolic system with long base lines for long-distance navigation. It transmitted from at least three stations set well apart. There are

several references to Radux in the literature from the later 1940s to the early 1960s but seemingly not of more recent vintage.
References: Henney 1959, Nav Systems-McGraw-Hill 1960, Lighthouse EB 1972

RADUX-OMEGA. A composite term of Radux, a LF Aid, with an added component at VLF resulting in Radux-Omega. Eventually a VLF version was developed and the Radux portion dropped out.
References: Blanchard JN 1991, Sakran IEEE 1998

RANA. Rana is a continuous wave system using phase comparison methods. It involves a ship- board receiver and ground-based transmitters. A chain has three stations with two sets of transmitters per station. A station consists of a master unit on one frequency and a slave unit for the second and third frequencies. The slave unit synchronizes emissions thereby creating a hyperbolic pattern of considerable accuracy.
Reference: IALA 1970

TORAN. A hypebolic system of considerable precision. A shipbased receiver determines phase differences from three transmitters . Toran is HF though the confocal transmitters produce a LF beat indication.
Reference: IALA 1970

5D5 Partially Hyperbolic Aids

a) Consol

BPM-5. A USSR version of the Consol system.
Reference: Cutler 1986

CONSOL.
Classification #: 2523
Form of Aid: Radio Aid to Marine Navigation
Operation: Signals emitted by Hyperbolic Aids produce short baselines -- which are straight lines or great circles more than hyperbolae -- are termed "collapsed" hyperbolic systems. Consol is of this nature. Consol can be viewed as both radial

and hyperbolic. In effect the hyperbolic is not in use. It can be employed as a Radio Beacon though its capabilities and values go beyond that Aid. As a Radio Beacon it combines directional and rotational forms. Each unit has one transmitting station with three antennas. Consol provides bearings of a long distance character. Only simple shipboard receiving equipment was needed to receive the signals and determine positions.
Comments: Consol is a derivative of Sonne. Sonne served as Germany's long range Aid in World War II; ICAO included it under the UK designation of Consol. Differences between Sonne and Consol were small.
References: IHB 1965

CONSOLAN. A version of Consol employed in parts of the US at one time. Consolan utilized two aerials rather than Consol's three aerials with a shorter range.
References: IHB 1965, Bradford 1972

ELEKTRA/ELECTRA. This device is the ancestor of Consol. Elektra was renamed and further developed under the name of Elektra.
Reference: IRE 1949, USNOO 1969

SONNE. The term is that of a hyperbolic Radio Aid later named Consol. An earlier version of Sonne was Elektra.
Reference: Hall 1947, Bowditch 1966

TWO-AERIAL CONSOL. This version has two aerials instead of the three aerials of Consol. The system known as Consolan also has a two aerial version.
Reference: IHB 1965

b) Raydist Aids

LORAC. Lorac= LOng/Range/Accuracy. This is a radio navigation system that employs phase comparison methods to create hyperbolic LOPs. The system creates beat frequencies as an element of the process. A Lorac chain has three stations: one main and two side. Beat frequencies are established by bring together the signals of two of the stations by the remaining station. It is employed

for survey work. Lorac is separate yet similar to Raydist. IALA refers simply to Lorac but IHB refers to Lorac A, B, and LM. The first two focus on position-fixing while LM measures distance.
References: IHB 1965, USNOO 1969, IALA 1970

HYPERBOLIC RAYDIST. Similar to Lorac except that one transmitter is aboard ship and the frequency modulation approach is employed.
Reference: Bowditch 1966

PURE-RANGE RAYDIST. This system employs phase comparison of beat frequencies emissions. It involves two stations but is not hyperbolic.
References: IHB 1965

RAYDIST. A radio navigation system employed primarily for hydrographic, geophysical survey, and ship trials work. It uses phase comparison methods employing two physically separate cw signals. The variety of forms determine position though hyperbolic, circular or elliptic LOPs. They include Hyperbolic Raydist, Pure-Range Raydist, Raydist Types E, M, DM, N. Several transmitters and receivers are involved in transmitting and receiving signals which are compared and thereby determine location of the vessel. The heading for this section is Raydist Aids. Aids is added to the core term in order to encompass the varied forms. Raydist is not represented in the classification since it is not primarily an Aid to Navigation.
References: USNOO 1969, Special Issue-IEEE 1993, IHB 1965

RAYDIST, TYPE DM. Type DM (Distance Measuring) employs elliptic circular coordinates that create two circular positions which are more accurate for position information than hyperbolic forms. Transmitters are located on the vessel and on shore. A second shore station processes the signals and transmits the results to the vessel. The shipboard station, through further comparison of the signals, determines distance to shore units.
References: IALA 1970, USNOO 1969

RAYDIST, TYPE DR. This Aid is similar to Type DM but it has two separate distance measuring systems. The second system does not depend on the first, and

the shore stations are not interconnected. Two frequencies and more equipment are required for DR than for DM.
Reference: IHB 1965

RAYDIST, TYPE E. A range system similar to Type DM but employed for ocean current research and ship trials.
Reference: IALA 1970

RAYDIST, TYPE M. A hyperbolic system with shore transmitters, shipboard transmitter and three receivers. Beat frequency emissions are phase compared which creates LOPs in hyperbolic patterns.
Reference: IALA 1970

RAYDIST, TYPE N. A hyperbolic system of three land transmitters with a fourth station that receives and creates beat frequencies. These result in phase comparisons of hyperbolic LOPs.
Reference: IALA 1970

5E Radar, Satellite, Sound-Radio & Miscellaneous Aids

5E1 Radar Reflectors

a) Overarching Terms & Corner Reflectors

RADAR REFLECTOR.
Classification #: 2512
Form of Aid: Marine Radio Aid to Navigation
Operation: An Aid to Navigation consisting of specially designed panels arranged to enhance reflection of energy transmitted from a shipboard unit.
Comments: Many Radar Reflectors are added to Buoys and some Fixed Aids in order to increase safety value in restricted visibility. Reflectors are of several designs with Corner Reflectors the most common in use.
References: IALA 1970

CORNER REFLECTOR. The basic form for many Radar Reflectors is that of the

Corner Reflector. This form consists of three flat surfaces intersecting at right angles thereby enhancing the reflector's visibility for a shipboard radar unit. Other forms of reflectors are configurations of the basic design.
References: IALA 1970, Wylie 1976

OCTAHEDRAL CLUSTER. This term refers to Radar Reflectors that consist of a group of Corner Reflectors in an eightfold patterns so that reflective energy is nearly uniform in all directions.
References: IALA 1970, Wylie 1976

PENTAGONAL REFLECTOR. A Radar Reflector made up of five Corner Reflectors.
Reference: IALA 1970

RADAR CORNER REFLECTOR. An infrequently employed term though potentially a more likely general term than Corner Reflector. Nonetheless, Corner Reflector serves as the main term for Radar Reflectors.
Reference: Bowen 1947

REFLECTOR. A shortened form of Radar Reflector.
Reference: Williams 1992

TRIHEDRAL REFLECTOR. An alternate name for Corner Reflector.
Reference: IALA 1970

b) Radar Reflectors: Other Forms

DIELECTRIC REFLECTOR. Reflector made of dielectric materials which have enhanced reflective capabilities. Dielectric materials have limited ability to conductivity, but they possess an enhanced ability to reflect energy waves. Only IALA 1970 includes this Reflector among surveyed sources. The main form of this type of reflector is the Luneberg Reflector.
References: IALA 1970

DIHEDRAL REFLECTOR. This form of Radar Reflector displays two surfaces

intersecting at right angles. It is also known as a Right Angle Reflector.
Reference: IALA 1970

LUNEBERG LENS/LUNEBERG REFLECTOR. A form of Radar Reflector that employs dielectric materials in a spherical form. It has a 360 degree azimuthal character thereby avoiding the gaps that appear with a Corner Reflector. The dielectric materials are placed in a fiberglass casing. One source, Skolnick, also mentions a heliosphere reflector which is a similar design though omitted in marine sources.
References: IALA 1970, Skolnik 1970

PARABOLIC REFLECTOR. A Radar Reflector based on a parabola curve. It manifests enhanced abilities to focus or direct radiated energy. Parabolic Reflectors are less common than Corner Reflectors.
References: Markus 1994, Gilbilisco 1994

RADAR BUOY. This Buoy includes a Radar Reflector as an integral element of the superstructures in contrast to a Buoy to which a Radar Reflector has been attached.
Reference: USNOO 1969

RADAR REFLECTOR BUOY. There is possible confusion over this term: it can conceivably be a Radar Buoy or a Buoy with a Radar Reflector attached though not as an integral component. Kerchove speaks of the reflector as forming a Top-mark which suggests it was not an integral unit.
References: Kerchove 1961, USNOO 1969, Elsevier 1965

RIGHT ANGLE REFLECTOR. An alternate for the Dihedral Radar Reflector.
Reference: IALA 1970

5E2 Secondary & Primary Radar Formss

a) Overarching and Primary Forms

MICROWAVE POSITION FIXING SYSTEM. A hydrographic aid for position

fixing of vessels without radar. Shore stations transmit from television transmitters with receivers on board the vessels. Three such shore stations create elements for fixing the position of the vessel. This is apparently a form of Primary Radar.
Reference: IHB 1965

RADAR AIDS/RADAR NAVAIDS. Terms appearing in Part H and Part J respectively. They have their origins in recognized terminology. But it is unclear if there are clear foundations in the literature for these variant forms. They are possibly coined terms to meet the needs of the studies.
References: Part H, Part J.

RADAR AIDS TO NAVIGATION. This is the title of a book by J.S. Hall in 1947 which includes not only Radar Aids but other Radio Aids as well. It offers a sub-arching term for the welter of Radar-related Aids.
Reference: Hall 1947

PRIMARY RADAR. A form of radar in which transmitted signals are received and reflected by the receiver target.
References: IALA 1970, Hyperbolic Systems-McGraw-Hill 1992

RATAN. This Aid employs primary radar rather than secondary radar. Information is transmitted to a ship by television.
Reference: IALA 1970

b) Shoran Forms

BENITO/CONDAR. Terms for older systems bearing some opeational resemblance to Shoran. Employment in marine navigation is unclear.
References: McGraw-Hill 1960, IRE 1949

ELECTRONIC POSITION INDICATOR. A variant form of Shoran. This version is used for off shore for survey work employing a lower frequency than the core form of Shoran.
References: Bowditch 1966, Lighthouses-EB 1972

HIRAN. This is form of Shoran of a notably precise character for surveying needs requiring exacting precision. Hiran=H-precision shoRan.
References: Bowditch 1966, USNOO 1969

OBOE. A UK version of Shoran with shorebased transmitters and a shipbased Transponder Beacon.
Reference: Kayton 1990

SHIRAN. A form of Shoran employed largely in aeronautical work.
Reference: Kayton 1990

SHORAN. A Secondary Radar system employing shipboard transmitter and two ground-based transponders which permit establishment of a ship's position.
Reference: Bowditch 1966, Bradford 1972, Hill 1958

c) Transponder Beacon Forms:

DERVEAUX. This is a French hydrographic position system which employs Transponder Beacons. It is a hydrographic system rather than an Aid to Navigation system yet there is an apparently peripheral navigation dimension even if only involving hydrographic vessels.
Reference: IHB 1965

CROSS-BAND RACONS/IN-BAND RACONS. Wylie divides Racons into Cross-Band forms that require a special receiver and are not on the radar band, and In-Band forms that are on the radar frequency band.
Reference: Wylie 1976

CROSS-BAND RAMARKS/IN-BAND RAMARKS. Wylie divides Ramarks or Radar Markers into In-Band Ramarks whose transmissions are received on ship-board radar and Cross-Band Ramarks which are received on a special receiver which can either be separate from a radar unit or integrated with it.
Reference: Wylie 1976

RACON. RACON=RAdar/beaCON. A Transponder Beacon that gives bearing and distance information.
References: Proceedings-IRE 1949, IALA 1970, Bowditch 1966

RACON RESPONSE ENHANCER. An alternate, and a possibly an informal alternate, for the Racon.
Reference: Naish 1985

RADAR BEACON. A secondary form of radar that is triggered by a shipboard transmitter. There are two forms: Racons and Ramarks.
References: IALA 1970, Bowditch 1966, Chadwick 1971

RADAR MARKER BEACON. See Ramark.

RADAR RESPONDER BEACON. One of several terms for the Transponder/ Transponder Beacon known as Racons and Ramarks.
Reference: Proceedings-IRE 1949, Elsevier 1965

RADAR TRANSPONDER BEACON. An alternate form that appears in Part J. Possibly influenced by Grover 1957.
References: Grover 1957, Part J

RAMARK. Ramark=Radar/Marker. This refers to a Radar Beacon (Transponder) that is nondirectional and provides bearing data but not distance information.
References: IALA 1970, USNOO 1969

RESPONDER. An alternate name for Transponder/Transponder Beacon.
Reference: Proceedings-IRE 1949

SECONDARY RADAR. A radar system in which a transponder is attached to the target. The transponder emits signals when triggered by the shipboard transmitter. Secondary Radar is not a Radio Aid in itself, but the term encompasses the form of radar used by most Radio Aids of this form, and is therefore included.
Reference: IALA 1970

TRANSPONDER/TRANSPONDER BEACON. These terms represent components of Secondary Radar which emit a signal when triggered by a shipboard transmitter. Racons and Ramarks are major forms of Marine Transponders. The terms Radar Beacon is virtually interchangeable with Transponder.
Reference: IRE 1949

5E3 Satellite Navigation Aids

a) Overarching & Other Terms

MARINE SATELLITE SYSTEMS. A plausible candidate for an overarching term for marine Radio Aids of the satellite form though possibly overly inclusive. It represents a possible alternate for Satellite Navigation Aids, the core overarching term for this study.
Reference: Bole 1992

NAVIGATIONAL SATELLITE. A very general term that can include Aids to Navigation usage. It is included because of its inclusion by USNOO 1969 with specific reference to NNSS.
Reference: USNOO 1969

SATELLITE. This may well be too general to be included in the Database yet the term approaches an Aids to Navigation level of usage.
Reference: Sutton-Jones 1985

SATNAV/SATELLITE NAVIGATION/SATELLITE NAVIGATION SYSTEM. Satnav is an acronym for SATellite NAVigation. Satellite Navigation is defined as an Navigation Aid by IALA rather than as a system of navigation or as an approach to navigation. It can also be viewed as referring to satellite systems rather than as a simple Aid. An alternate of the term includes the word System. On occasion Satnav stands alone and presumably that is adequate.
References: IALA 1970, Naish 1985, Kayton 1990, Keeler 1987

SATELLITE-BASED NAVIGATION/SATELLITE-BASED SYSTEM. Terms that are somewhat similar in meaning to Satellite Navigation System.

Reference: Hofmann-Wellenhof 2003

AEROSAT. A communication and surveillance system according to Douglas-Young. Though regarded by McDonald as having navigation capabilities. Seemingly no system is in use under that name as an Radio Aid.
References: Douglas-Young 1987, McDonald 1975

STARFIX. A privately owned satellite system. It is a system of considerable precision which can be employed for close-in navigation. It is primarily employed by the petroleum industry. DGPS may eliminate a need for Starfix.
References: Williams 1992, Hobbs 1990

b) Global Positioning System Forms

DIFFERENTIAL GPS. A ground station that receives data from GPS satellites, corrects errors in pseudo-range (one-way ranges), and retransmits the revised data to shipboard receivers.
Reference: Hobbs 1990

GLOBAL POSITIONING SYSTEM/GPS.
Classification #: 2530
Form of Aid: Marine: Radio Aid to Navigation
Operation: Satellite system containing numerous satellites yet requiring only a small number of units to supply accurate data for position determination. Each satellite emits messages on two UHF. Two forms of data are given: one phase gives satellite position in a context of time while the second phase gives orbits and operational status of all the satellites. The receiver uses the data to determine pseudorange and also to decide which satellites present the best data for position determination.
Comments: GPS is moving toward a substantial domination of navigation and Aids to Navigation in all modes.
Reference: Hobbs 1990

GLOSSNAS. A system developed by the former USSR and similar to Navstar GPS.

Reference: Kayton 1990

MARITIME DIFFERENTIAL GPS/MARITIME DGPS. US Coast Guard operates the Maritime Differential GPS Service from which the first term is derived. Hofmann-Wellenhof contributes the abbreviated version.
Reference: NIMA 2003, Hofmann-Wellenhof 2003

MARITIME GPS. A term that appears in one surveyed source and that on a chart. Adding "Maritime" to GPS differentiates it from aero forms.
Reference: Hofman-Wellenhof 2003

NAVSTAR/NAVSTAR-GPS/NAVSTAR GLOBAL POSITIONING SYSTEM. This is seemingly the "first name" of Navstar GPS. US DOD began the program in 1973 under the fuller name. Some older sources (e.g. McDonald) refer to it as Navstar while other sources employ Navstar GPS. Yet others -- including various new sources -- refer to it as GPS. Global Positioning System or GPS increasingly has become the common title.
References: McDonald c. 1975, Douglas-Young 1987, Hobbs 1990, Robinson 1985, Hofmann-Wellenhof 2003

NGPS. This represents an acronym for National GPS. This form of GPS is a general system for GPS throughout the US for multiple mode use.
Reference: FRP 1999

US AIR FORCE SYSTEM. This is not a formal name but rather the incorporation of the agency's name responsible for GPS. US Navy, however, is incorporated in terminology for Navsat.
Reference: NIMA 2003

c) Navy Transit Satellite Navigation System Forms:

CICADA. A system similar to US Transit; a product of the former USSR. Kayton, in an extensive listing of Radio Aids, links the two systems together..
Reference: Kayton 1990

NAVSAT (i). The original acronym for US Navy Satellite System.
Reference: Hobbs 1990
NAVSAT (ii). Navsat was also used by the European Space Agency in the 1970s. Seemingly, it is not an Aid to Navigation under that form of the term. Compare Navsat (i). It can also refer to Navigation Satellite.
Reference: US Naval Observatory

NNSS/NAVAL NAVIGATION SATELLITE SYSTEM. NNSS is the acronym for Naval Navigation Satellite System or Transit.
Reference: FRP 1992

NAVY TRANSIT SATELLITE NAVIGATION SYSTEM. Hobbs offers this conflation of Navy and Civil terms.
Reference: Hobbs 1992

TRANSIT/TRANSIT NAVIGATION SATELLITE SYSTEM
Classification #: .42.423
Form of Aid: Marine: Radio Aid to Marine Navigation
Operation: Satellite system of navigation. The satellites transmit on two frequencies with transmissions modulated by an additional signal giving various data (satellite time, orbit information). The receiver creates a single Doppler signal by processing both incoming signals. Position is determined by plotting frequencies interfaced with times of signal arrivals.
Comments: This is already an obsolete Aid.
References: Hobbs 1990, Fink 1982

TSIKADA. An alternative name for Cicada.
Reference: Hofmann-Wellenhof 2003

US NAVY SATELLITE SYSTEM/US NAVY SYSTEM. The literature frequently speaks of NNSS though Hobbs presents this as a possible alternative. NIMA provides an additional alternative.
Reference: Hobbs 1990, NIMA 2002

d) Other Satellite Systems

CONVENTIONAL DGNSS. A term that distinguishes standard from precise or very accurate form of DGNSS.
Reference: Hofmann-Wellenhof 2003

DIFFERENTIAL GNSS, DGNSS. Terms for corrected GNSS for precision navigation. GNSS can refer to current versions of GNSS though it can also refer to a future improved version.
Reference: Hofmann-Wellenhof 2003

DIFFERENTIAL LORAN-C (DLORAN-C). Term for LORAN in a corrected form for precise navigation. The principle of operation is in alignment with DGPS.
Reference: Hofmann-Wellenhof 2003

GALILEO. Term for a European Satellite Navigation System that is independent of GPS and GLNASS both of which are military systems.
References: Hofmann-Wellenhof 2003, APN 2002

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). This term has three possible meanings. It can refer to any system that provides Navigation Aid data by satellite. It can refer to existing systems such as GPS and GLONASS. Or it can refer to a system in development by ICAO that goes beyond existing Satellite Navaids. GPS is perceived as not fully supplying the level and breadth of navigation needs and thereby less than adequate in some respects. GNSS is intended to be a civil system that measures up to all users.
Reference: ICAO 1997

LORAN GNSS (LOGIC). Loran-C is here employed as the foundation of an augmentation GNSS system by Eurofix.
Reference: Hofmann-Wellenhof 2003

OMNISTAR. Term refers to commercial DGPS operation with a nearly global range. It is a spaced-based agumentation system.
Reference: Hofmann-Wellenhof 2003

PRECISE DGNSS. Term refers to a type of DGNSS that achieves very accurate corrections of GNSS transmissions.
Reference: Hofmann-Wellenhof 2003

5E4 Other Forms

a) Sound/Radio Aids

DISTANCE FINDING STATION. A system for determining distance to an Aid to Navigation station by calculating arrival of Radiobeacon signals and sound signals at special synchronized stations. Naish 1985 refers to a "Talking Beacon" which is an informal term for this Aid.
References: USCG 1962, Naish 1985

RADIO SONOBUOY. An alternate name for Sonobuoy.
Reference: USNOO 1969

RAFOS. This is SOFAR spelled backwards and it is the reverse of Sofar. Sound signals are created at shore stations and time difference arrivals are determined by microphones positioned underwater. It is primarily a hydrographic system.
Reference: Bowditch 1966

SOFAR. A hyperbolic system employing sound transmissions in water. SOFAR= SOund/Fixing And Ranging. Depth charges at several points are timed and a navigational fix can thereby be established. This is more a sound Aid than a Radio Aid though hyperbolic.
References: Bowditch 1966, Hill 1958

SONOBUOY. A buoy with transmitter that emits a radio signal when activated by an underwater acousticl signal.
References: USNOO 1969

SONO-RADIO BUOY. An alternate name for Sonobuoy.
References: USNOO 1969

References: USNOO 1969

SYNCHRONIZED RADIO & AIR FOG SIGNAL. An older title for the Distance Finding Station.
Reference: Strobridge 1974

"TALKING BEACON". Term employed by Naish to describe special marine Aids to Navigation employing Radiobeacons and Sound Signals for determining distance to the station. Apparently this is the Direction Finding Station under a colloquialism.
Reference: Naish 1985

b) Miscellaneous Forms

General Comments: There is frequently no precise boundary between Marine Radio Aids and aeronautical and hydrographic Aids. Many of the uncertain entities are related to subdivisions of Radio Aids of this Database and placed there. However, there a few devices of a singular or uncertain provence and those entries are listed here.

A-N RADIO RANGE. A form of Radio Aids for aircraft. Continuous equisignal when on course but a Morse code "A" message if left of course line and "N" if to right. Similar to some forms of Radio Beacons and included by IALA 1970.
References: IALA 1970, Douglas-Young 1986

HYDRODIST. A system employed mostly for survey purposes. It constitutes a positioning system.
Reference: USNOO 1969.

NAVAGLOBE & NAVARHO. Two related long distance and LF Radio Aids. Navaglobe transmits bearing information and when additional equipment is added it also gives distance information thereby becoming Navarho. They are not hyperbolic systems.
References: Grover 1957, Henney 1959

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