

T-M

TRANSPORTATION-MARKINGS
DATABASE:
AERONAUTICAL
NAVIGATION AIDS

2nd Edition

Brian Clearman

Mount Angel Abbey

2009

TRANSPORTATION-MARKINGS
DATABASE:

AERONAUTICAL
NAVIGATION AIDS

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NAVIGATION AIDS

Part Iiv, Second Edition

Volume III, Additional Studies

Transportation-Markings: A Study in
Communication Monograph Series

Brian Clearman

Mount Angel Abbey

2009

Dedicated to my Grandparents:

Catherine Abbie Brady Sauer, 1878-1919

Frederick William Sauer, 1869-1944

Annie Donaldson Clearman, 1879-1966

Frederick William Des Coudres Clearman, 1871-1968

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PREFACE

The *T-M Database* (i, ii, iii, iv, v) of this Series draws together the several dimensions of T-M. It shares this drawing together function with the *T-M General Classification* (Part H). Perhaps paradoxically the two works draw together by focussing on the individual entity. Both studies illustrate the connections between T-M phenomenon as well as providing a focus on the individual unit. Yet in that process the full panoply of T-M is unfolded including their shared and connected state.

There are thousands of T-M forms. 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 multifoliated multiplicity. Yet ultimately the multiplicity leads to the basic unity of Safety Aids of whatever kind. The variety and diversity point to a restricted system of messages serving one essential purpose: the promotion of safety. The perennial 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 safety aids in separate studies though all remain components of Part I. The amount of labor required to prepare the Database precludes assembling all four modes of T-M in a single study (though eventually they may be united). A fifth element has been added that brings together the classifications of the four earlier studies.

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 forms under that general heading, including that of Pavement Markings. In order to reduce any confusion a hyphen has been added that conjoins Transportation and Markings: Transportation-Markings instead of Transportation Markings. Further information on the

hyphen has been added that conjoins Transportation and Markings: Transportation-Markings instead of Transportation Markings. Further information on the use of the hyphen for T-M is included in the first edition Preface.

Classification has been a vital part of T-M from the beginning. It had been hoped to make heavy use of taxonomy in the Database Studies. But the use of the classification in the Database has proven to be problematical. Various T-M forms and classification numbers are not always reflected in the Database. And, conversely, terms of significance in the Database are not always reflected in the classification. As a result the classification did not have a direct role in the first edition of this Study. However, it has a greater role in this edition: Key terms among lighted, unlighted and electronic forms have incorporated the classification designations from the classification. These key terms incorporate many other terms. Further information on the classification situation is included in the first edition.

Acknowledgements for the first edition apply here as well.

ABBREVIATIONS

Organizations:

ARL	Aeronautical Research Library
ATA	Airport Transportation Association
CAA	Civil Aviation Authority
DOD	Department of Defense
DOT	Department of Transportation
FAA	Federal Aviation Administration
HR	US House of Representatives
H & P	Hughey & Phillips
ICAO	International Civil Aviation Organization
IES	Illuminating Engineering Society
ITTE	Institute of Traffic & Transportation Engineering
M E	Multi Electric

NATO	North Atlantic Treaty Organization
Nav Fac Eng	Naval Facilities Engineering Command
PICAO	Provisional International Civil Aeronautical Organization
RAE	Royal Aerospace Establishment

Publications:

AI	Airports International
AD	Aerodromes, ICAO
AT	Aeronautical Telecommunications, ICAO
ADM	Aerodrome Design Manual, ICAO
ADS	Airport Design Standards, FAA
AIM	<i>Aeronautical Information Manual</i>
AIP	<i>Airman's Information Publication</i>
AMD	<i>Amendment, AD, AT, ICAO</i>
Ap L Eq	<i>Approved Lighting Equipment</i>
ASM	<i>Airport Service Management</i>
ATA	<i>ATA Airline Airport Design Recommendations</i>
ATW	<i>Airport Transport World</i>
AW	<i>Aviation Week</i>
Ben & Lux	<i>Belgium & Luxembourg AIP</i>
Com Cal Pd	<i>Compass Calibration Pad</i>
DOT & AID	<i>Aids to Air Navigation in S.E. Asia</i>
EALS	<i>Emergency Airfield Lighting System, US Air Force</i>
EC	<i>Electrical Communication</i>
Econ Ap	<i>Economy Approach Lighting Aids</i>
FI	<i>Flight International</i>
FR	<i>Final Report, Arcata 1949</i>
FRP	<i>Federal Radionavigation Plan-DOD/DOT</i>
Glob Pol	<i>Global Policies: see Olsen</i>
GPSW	<i>GPS World</i>
HD	<i>Heliport Design</i>
H I Rnwy	<i>High Intensity Runway Lighting</i>
Interagency	<i>US Interagency Ground Inspection Manual</i>

IA	<i>Interavia</i>
IEEE	<i>Institute of Electronics & Electronic Engineering Proceedings</i>
IFH	<i>Instrument Flying Handbook</i>
IB	<i>ICAO Bulletin</i>
IJ	<i>ICAO Journal</i>
JN	<i>Journal of Navigation</i>
Low Vis Txwy	<i>Low Visibility Taxiway Lighting System</i>
Maintenance	<i>Maintenance Guide ... 1971/Maintenance of Airport... 1982/Maintenance of Instrument ... 1986</i>
Mil Specs	<i>Military Specifications</i>
NavAer	<i>Navy Dept, BoA, NavAer Design Manual</i>
NOTAMS	<i>Notice to Airmen</i>
OML	<i>Obstruction Marking & Lighting</i>
PHAK	<i>Pilot's Handbook of Aeronautical Knowledge</i>
Retro Taxi	<i>Spec for L-859</i>
R & T Edge	<i>Runway & Taxiway Edge Lighting</i>
R & T Mrkrs	<i>Marking of Serviceable ...</i>
Spec	<i>Specification (s)</i>
Standard Spec	<i>Standard Specifications for Construction of Aiports</i>
STOL Port	<i>Planning & Design Criteria ...</i>
Supplement	<i>AD, AT, ICAO</i>
Txwy C L	<i>Taxiway Center Line Lighting</i>
Txwy Guid	<i>Taxiway Guidance Sign System</i>
VGLS	<i>Visual Guidance Lighting Systems</i>

Authors:

A & W	Ashford & Wright
CD	Douglas, Charles
D & B	Douglas & Booker
F & A	Fukumoto & Abe
H & R	Hundley & Rowson
L & W	Last & Ward

P & B	Parnell & Boughton
S & K	Swider & Kaser
T & C	Tetley & Calcutt

CHAPTER ONE

AERO LIGHTED NAVAIDS

1A Indexes: Categories & Alphabetical

1A1 Categories

Overarching Terms: General & Visual Terms (1B)

General Terms for All Aero Navigation Aids (1B1)

Primary Terms (1B a))

General Note

Aeronautical Navigation Aids

Nav aids

Navigation Aids

Navigational Aids

Navigational Aids (Nav aids)

Nav aids Systems

Navigation Aids Systems

Navigational Systems

Aids

Aids to Air Navigation

Aids to Navigation

Air Nav aids

Air Navigation Aids

Air Navigational Aids

Specialized Terms (1B1 b))

Aero Aids/Aero Safety Aids

Aeronautical Aids

Aeronautical Lights

Aerospace Navigational & Landing Aids

Aids to Aerial Navigation

Air Navigation & Obstruction Lighting

Air Navigation Systems

Aircraft Landing Aids

Approach & Runway Light System

- Aviation Navigation Aids
- Electronic & Visual Air Navigational Aids (Nav aids)
- Ground Aids to a Contact Flight
- Ground-Based Navigation Aids
- Ground Systems
- Landing Aids
- Landing Aids to Air Navigation
- Landing Aids to Navigation
- Landing & Navigation Aids
- Mobile Airfield Lighting System
- National Airspace System (NAS) Ground-to-Air (G/A) Systems
[Landing Sub-Element]
- Navigation Systems
- Portable Heliport Lighting System
- Radio & Navigation Aids System
- Temporary Airfield Lighting
- Visual Aids for Approach & Landing
- Visual Aids Terms (1B2)
 - General Note
 - Aero Visual Lights/Visual Aero Aids
 - Aeronautical Lighting & Other Airport Visual Aids
 - Airport Visual Aids/Airport Visual-Aid Systems
 - Airport Visual Navigation Aids System
 - All-Weather Visual Aids
 - Aviation Lighting
 - Ground Visual Aids
 - Landing Aerodrome & Airway Lighting
 - Visual Aids
 - Visual Aids for Airports
 - Visual Aids to Air Navigation
 - Visual Nav aids
 - Visual Aids System
 - Visual Ground Aids
 - Visual Landing Aids
 - Visual Air Navigational Aids

- Visual Signals
- Visual Landmarks
- Sub-Overarching Terms (1B3)
 - General Note
 - AGA Aerodrome Ground Aid
 - Approach & Landing Systems
 - Approach & Navigation Lights
 - Approach & Runway Lighting/Approach & Runway Lighting System
 - Approach & Threshold High Intensity Unidirectional Sequence-Flashing Lights
 - Approach, Threshold, & Runway Lights & Runway Marking
 - Approach, Threshold, & Runway End Elevated High-Intensity Lights
 - Approach/Threshold/Runway End Inset Light
 - Approach/Threshold/Runway High Intensity/Unidirectional Elevated Light
 - Medium Intensity Approach, Threshold, Runway Edge Lighting
 - Miscellaneous Visual Approach Aids & Airport Beacons
 - Semi-Flush Approach & Threshold Lights
- Overarching Terms for Lighted Aero Navigation Aids (1B4)
- Light & Lighting Aids Terms (1B4 a)
 - General Note
 - Aero Lights
 - Light
 - Light System
 - Lighted Aids for Air Navigation
 - Lighting
 - Lighted Aids
 - Lighting Aids
 - Lighting System/Light System
- Airfield & Airport Light/Lighting Terms (1B4 b)
 - Aerial Lighting
 - Air Lights
 - Airfield Lights
 - Airfield Lighting
 - Airfield Lighting Systems
 - Airfield Ground Lighting

Airport Lighting
Airport Lighting Aids
Airport Lighting Systems
Airport Ground Lighting Equipment
Airway Lighting
Airway Lighting Equipment
Aviation Ground & Seadrome Lighting
Aviation Ground Lighting
Aviation Lighting
Aviation Lighting Equipment
Aviation Lighting Systems
Field-Lighting for Airports
Airport Lighting Equipment
Airport Light Products
Airport Lights
Aerodrome Light System
Aeronautical Ground Light
Aeronautical Ground Lighting
Airport & Air Navigation Lighting & Marking Aids
Airport Lighting for Small Airports
Fixed Lights
Ground Lighting
Ground Lighting Aids
Ground Lighting to Aid Navigation
Ground-Positioned Lighting
Landing Lights
Lighting/Marking/Lighting & Marking
Lighting & Marking System
Marking & Lighting/Marking & Lighting Systems
Navigation Lighting
Passive Airport Lighting
Powered Lighting Systems
Signal Lights
Signal Lighting Equipment
Systems of Lights

Visual Traffic Control Aids
Color & Other Messages (1B5)
General Note
Colors (1B5 a))
General Notes I, II
Yellow
Amber
Blue/Blue Glass Filter
Red
Aviation Red
Aviation Green
Aviation Yellow
Ruby Glass/Ruby Glass Globes
Green
White
Aviation White
Aviation Variable White/Variable Intensity White/Variable White/
Variable-White
White Hot/Bright White
White (Natural Sunlight)
Clear/Clear Globe/Clear Prismatic Globes/Clean Lens
Clear (White) Light/Clear White/White (Clear)/Clear Light
Bluish White
Color Combinations (1B5 a) 2))
General Note
White/Green
White/Yellow
Red/Yellow
Red/White
Red/Green
Clear/Green
Yellow/Red
Green/Yellow

Day Color Usage

- General Note
- International Orange
- Orange
- Aviation Orange
- Black/Yellow
- Black/Chrome Yellow
- Chrome-Yellow/Dead Black
- Chrome-Yellow/Black
- Chrome-Yellow/Dull Black
- Historic Uses (1B5 b))
 - General Note
 - Boundary Lights
 - Range Lights/Range-Lights
- Contemporary Usages (1B5 c))
 - General Note
 - Approach Lighting
 - Medium Intensity
 - High Intensity
 - Beacons
 - General Note
 - White and Green
 - White and Yellow
 - Green, Yellow, White
- Final Approach Lighting
 - General Note
 - VASI
 - T-VASI
 - PAPI
 - PLASI
 - Tri-Color System
- Obstruction Lighting
 - Red
 - White
- Runway & Taxiway Lighting
 - Taxiway Lighting

- Blue
- Green
- Green & Yellow
- Clearance Bars & Runway Guard Lights
- Yellow
- Runway Centerline Lighting
- White
- Red and White
- Red
- Stop Bar Lights
- Red
- Touchdown Zone Lighting
- White
- Taxiway Lead-Off Lights
- Green and White
- Land & Hold Short Lights
- White
- Runway Edge Lights
- White
- Yellow
- Runway End Lights/Threshold Lights
- Red
- Green
- Beacons & Obstruction Lighting (1C)
- General Note
- Overarching Terms (1C1)
- Beacon
- General Notes I, II
- Aerodrome Beacon
- Aeronautical Beacon
- Aeronautical Light Beacon
- Air Beacon
- Aviation Beacon
- Beacon Aids
- Beacon, High Intensity

- Beacon, Light
- Light Beacon
- Physical Apparatus (1C2)
- Method of Operation-Related Terms (1C2 a))
 - Airport 36" Rotating Beacon
 - Rotating Beacon
 - Flashing Beacon
 - Rotating Beacon for Small Airports
 - Rotating Electric Beacon
 - Rotating Lights
 - Rotating Light Beacon
 - Revolving Beacon
 - Oscillating Beacon
- Dimension-Related Terms (1C2 b))
 - General Note
 - 10-Inch Rotating Beacon
 - 18-Inch Beacon
 - 24-Inch Airway Beacon
 - 24-Inch Beacon/Twenty-Four Inch Beacon/24-Inch-Diameter Beacon/
 - Twenty-Four-Inch Beacon
 - Twenty-Four-Inch Double-End Rotating Beacon
 - 24-Inch Rotating Beacon
 - 24-Inch Dome/24-Inch Double End/36-Inch Double End/24-Inch Single End
 - Rotating 24-Inch Beacon
 - Beacon, 36-Inch Rotating Beacon
 - Beacon, 36-Inch, Double-End Type
 - CAA-291 36-Inch Rotating Beacon
 - Four-Beam 24-Inch Beacon
 - 36-Inch Beacon
 - 36-Inch Double End, Rotating Beacon/36-Inch Double-end Rotating Beacon
 - 36-Inch Rotating Beacon
 - 36" Rotating Beacon
 - 36-Inch Revolving Beacon
 - Thirty-Six-Inch Spherical Rotating Beacon
 - Double-Ended 36-Inch Diameter Beacon

DCB 36-Inch Rotating Beacon/DCB Rotating Beacon/DCB Rotating-10
Beacon

Energy Source-Related Terms (1C2 c))

General Note

Acetylene Beacon

Acetylene Gas Beacon

Electric Beacon

Electric Beacon Light

Electric Light Beacon

Flashing Gas Beacon

Gas Beacon

Gas Flashing-Beacon/Gas-Flashing Beacon

Morphological Terms (1C3)

Airport Beacons (1C3 a))

Airfield & Airport Beacons 1)

General Note

Aerodrome Identification Beacon

Aeronautical Beacon Light

Airfield Beacon

Airport/Heliport Beacon

Airport Identification Beacon

Airport (Land) Beacon/Airport (Water) Beacon

Alt Green/White Beacon/Alt Yellow/White Beacon

Civil Airport Light Beacon

Medium Intensity Airport Beacon

Military Airport Beacon

Rotating Searchlight Beacon

Code Beacons 2)

Code Beacon

Airport Code Beacon

Airport Rotating Beacon

Auxiliary Airport Beacon

Auxiliary Beacon

Auxiliary Code Beacon

Auxiliary Airport Code Beacon

- Auxiliary Green Code Beacon
- Electric Code Beacon
- Flashing Code Beacon/Flashing-Code Beacon
- Flashing Green Beacon
- Identification Beacon
- Identification (Code) Beacon/Identification Code Beacon
- Long Range Beacon
- Rotating Airport Beacon
- Rotating Beacon for Small Airports/Airport Rotating Beacon for Small Airports
- Airway Beacons (1C3 b))
 - Acetylene Gas Blinker
 - Airway Beacon
 - Air-Way Beacon
 - Airway Beacon Light
 - Airway Light Beacon
 - Air-Route Beacon
 - Automatic Routing Beacon
 - Auxiliary Blinker Light
 - Aviation Routing Beacon
 - Course Light/Course-Light
 - Fixed Course Light
 - Electric Routing Beacon
 - En Route Beacon
 - Gas Routing Beacon
 - Lighted Airway
 - Route Beacon
 - Routing Beacon
 - Sperry Airways Beacon
- Heliport Beacons & Other Forms (1C3 c))
 - Heliport Beacon
 - Heliport Identification Beacon
 - High Intensity Heliport/Medium Intensity Heliport Beacon
 - Heliport Rotating Beacon
 - Identification Beacon for Heliport Use

- Revolving Projector Type of Beacon
- Rotating Heliport Beacon
- Seaplane Base Identification Beacon
- Seaplane Base Light Beacon
- High Intensity Seaplane Base Beacon/Medium Intensity Seaplane Base Beacon
- Stolport Beacon
- Miscellaneous Forms & Support Structures (1C4)
- Miscellaneous Forms (1C4 a))
 - Approach Light Beacon
 - B.B.T. Flashing Beacon
 - Cluster Beacon
 - Flickering Beacon
 - Incandescent Beacon
 - Landmark Beacon
 - Solar Powered Beacon
- Support Structures (1C4 b))
 - General Note
 - 51' Airport Beacon Tower
 - Beacon Tower
 - Prefab Tower Structure
 - Structure Steel Tower
 - Tubular Steel Tower
 - Double Wood Pole Tower
 - Tubular Tower/Tubular Beacon Tower/Tubular Steel Airport Beacon Tower
 - Airport Beacon Tower
 - Tower, Aerial Navigation Beacon
- Obstruction Lighting (1C5)
 - General Note I, II, III
- Overarching Terms (1C5 a))
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 - Hazard Beacon
 - Hazard Light
 - Hazard Warning Beacon
 - Obstruction Lighting

- Obstruction Identification
- Obstruction Lights
- Obstruction Marker Lighting
- Obstacle Light
- Obstruction Marking & Lighting
- Tower & Obstruction Lighting/Tower Obstruction Lighting
- Red Danger Light
- Beacons (1C5 b))
 - Anticollision Beacon
 - Beacon, 300mm Hazard/300mm Beacon (Obstruction), 300mm Hazard Beacon/300-mm Hazard Beacon/300mm Beacon/300mm Hazard Beacon (Red)
 - Red Beacon (Obstruction)
 - Flashing Beacon
 - Flashing Hazard Beacon/Flashing Red Hazard Beacon
 - Flashing, Omnidirectional Beacon
 - Light, Navigational, Beacon, Obstacle or Code
 - Obstacle Beacon
 - Obstruction Strobe Beacon
 - Rotating Beacon
 - Rotating 24-Inch Beacon
 - 300mm Code Beacon/Flashing Code Beacon/300mm Code & Hazard Beacon
 - 300-Milimeter Fresnel Lensed, Obstacle or Code Beacon Navigational Light
- Obstruction Lights-Incandescent & Miscellaneous Forms (1C5 c))
 - Aviation Red Obstruction Light
 - Double & Single Obstruction Lights
 - Double Obstruction Lights
 - Field Obstruction Light
 - Low Intensity Obstruction Light
 - Neon Obstruction Lighting
 - Obstruction Marker Light
 - Red Obstruction Lighting
 - Single Obstruction Light
 - Steady-Burning Lights/Steady Burning Red Obstruction Light
 - Suspension Type Obstruction Light

Obstruction Lights-Strobe & Composite Forms (1C5 d))

Catenary Lighting

Daytime Lighting for Tall Obstructions

Dual Lighting/Dual Lighting System

Dual Lighting with Red-Medium Intensity Flashing System/Dual Lighting

Red--Medium Intensity Flashing White/Dual Red-White Medium Intensity

Obstruction Strobe Beacons

High Intensity Flashing White Lights

High Intensity Flashing White Obstruction Lights

High Intensity Obstruction Lighting System

High Intensity White Obstruction Light

Low-Power Consumption Strobe-Type/Strobe-Type Flashing Red

Obstruction Light

Medium Intensity Flashing White Obstruction Light

Medium Intensity Flashing White Obstruction Lights 40 FPM/Medium

Intensity Flashing White Obstruction Light, 60 FPM

Medium Intensity Obstruction Strobe Beacon/Medium Intensity Obstruction

Strobe

Medium Intensity Omnidirectional Flashing White Light System

Medium Intensity Strobe

Obstacle Lights

Low-Intensity Lights

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1B Overarching Terms: General and Visual Terms

1B1 General Terms for All Aero Navigation Aids

a) Primary Terms.

General Note. All primary terms include the word "Aids." Nearly all terms include the words "Navigational" or "Navigation". Several terms include the word "Air". In many instances terms beginning with Aid or Aid to ... refer to devices external to aircraft though not always (T-Ms are always external). A common term in the literature, Navaid, is a contraction of Navigation or Navigational and Aid. In some sources Navaid is a radio aid only. In US marine usage Navigation Aids are external to a mode of transport while Navigational Aids can be mode-based; this is not the case, for example, in the United Kingdom. However, in aero usage navigation and navigational are very often interchangeable. The listing and describing of terms is not a precise exercise: the welter of terms overlap, intermingle with one another; though there are fewer contradictions than it may first seem.

AERONAUTICAL NAVIGATION AIDS. Term employed in Part G of the Monograph Series. The term may have been coined or altered by the writer. A single term was required for that study which would encompass all safety aids for air navigation. AIM so employed Navigation Aids though many other sources did not. AIM also employs the word Aeronautical in several places and that usage may have influenced the use of that term. The word aeronautical is needed when Navigation is not included though perhaps it is not needed when navigation is present. Nonetheless, Part G includes both aeronautical and navigation.

Classification: None

Comment: This term is the heading in the classification study for this form of Aid. But it lacks a classification number though serving as a heading. Possibly some form of numerical designation is needed for an additional edition.

References: AIM (US) 1973, Part G

NAVAIDS. This term is a contraction of Navigation and Aid and/or Navigational

and Aid. It is a general term though not infrequently associated only with Radio Aids. Nav aids can have a meaning simply beyond specific aids. It may include airborne equipment and other processes and devices. There are instances in which the term has a more restricted meaning because the topic under discussion is restricted in nature; such an usage may not exclude other uses.

References: Wilson 1979, AIM 1973, Komons 1978, Olsen AI 1991

NAVIGATION AIDS. This term is closely allied with Nav aids and Navigational Aids. It can include Visual Aids and is thereby a general term. Navigation Aids is possibly more of a general term than Nav aids since that term is often associated with Radio Aids. Non-aids may be included in this term (such as radar).

Navigation Aids probably has a radio-only meaning for some sources.

Reference: Taneja 1987, IFH 1971, AIM 1991, PHAK 1971, Field 1985

NAVIGATIONAL AIDS (NAVAID). This Aid is closely related to Navigation Aids terms. The meaning is similar though more non-aid elements may be included in this term at least for some sources. The diversity of sources and uses precludes a precise description of the meaning of the term.

References: Field 1985, Whitnah 1966, Airport Design 1999, AIM 2004 (Abbrev)

NAVIGATIONAL SYSTEM. An overarching term that is perhaps overly inclusive except when placed in a context of Nav aids.

Reference: AIM 2004

NAVAID SYSTEMS. This term seemingly appears only in one source. It applies only to radio systems which is true of the publication in its entirety.

Reference: DOT & AID Aids ... SE Asia 1971

NAVIGATION AIDS SYSTEMS. A single surveyed source includes this term. It includes all forms of Aids. It is probably equivalent to Navigation Aids.

Reference: Taneja 1987

AIDS. A very general term that is almost too general. PHAK employs the term though the precise meaning is not clear. Clark employs Aids in reference to two Visual Aid Indicators but he does not use term as a general heading.

Reference: PHAK 1971, Clark 1993

AIDS TO AIR NAVIGATION. This term can be confined to radio devices though often it is a more general term. Library catalogues frequently employ it as a subject heading. CAA sees it an overarching term.

References: DOT & AID SE Asia ... 1971, CAA 1945, PICA0 1944

AIDS TO NAVIGATION. This term more often refers to marine aids though aero aids can be included. Some library catalogues include aero aids under this heading while other libraries exclude such aids. It is definitely an overarching term. Field drops the "s" from Aids.

References: Leary 1985, CAA 1945, Field 1985

AIR NAVAIDS. This term and the following two terms can be regarded as general terms though some sources include only radio aids. Nav aids not infrequently include only Radio Aids.

References: DOT & AID Aids SE Asia ... 1971

AIR NAVIGATION AIDS. This term, while giving the appearance of a general term not infrequently includes only Radio Aids in some sources.

Reference: AIM 1991, NOTAMS 1987, DOT & AID Aids ... SE Asia 1971

AIR NAVIGATIONAL AIDS. Only a few sources include this term. One is visual in scope; a second tends toward radio though some limited visual aids are included.

References: Pilot's Guide 1944, Airport Design 1973, AIM 1991

b) Specialized Terms

AERO AIDS/AERO SAFETY AIDS. Possible coined terms from Part J.

Reference: Part J, 2002

AERONAUTICAL AIDS. This appears to qualify as an overarching term for current use. Yet only one surveyed source includes it and that source is historical. Its meaning is not fully clear. It seemingly excludes Lighted Beacons, and Radio

Beacons. It possibly includes airport lights.

Reference: CAA 1947

AERONAUTICAL LIGHTS. Lighted (“luminous”) signal or sign of an official character that serves as an Aid to Air Navigation.

Reference: PICA0 1944

AEROSPACE NAVIGATIONAL & LANDING AIDS. Variant term for NavAids from Thompson. Term may be influenced by perspective of article on oversight of aviation activities. Term includes GPS. See also: Aviation Navigation Aids.

Reference: Thompson 1993

AIDS TO AERIAL NAVIGATION. A rare term in the literature. It is from 1922 and reflects the use of the word aerial in early aviation. It refers only to visual aids because of the time period (Radio Aids were of course in an early stage).

Reference: Lights as ... 1922

AIR NAVIGATION & OBSTRUCTION LIGHTING. Overarching term for Aeronautical Light Beacons, Code Beacons, Course Lights, Obstruction Lights.

Reference: AIP 1999

AIR NAVIGATION SYSTEMS. This term probably refers only to Radio Aids though it gives an appearance of a general term. However, it is a broad term in that context and includes aircraft-based devices.

Reference: Kendal 1990

AIRCRAFT LANDING AIDS. A general term that has specific reference to historic Aids.

Reference: Mola 2003

APPROACH & RUNWAY LIGHT SYSTEM. Term from a study of “optimum intensity settings” that includes these two forms of Aids.

Reference: Douglas 1979

AVIATION NAVIGATION AIDS. An infrequently employed term. Possibly

influenced by perspective of article on oversight of aviation activities. See also: Aerospace Navigational & Landing Aids.
Reference: Thompson 1993

ELECTRONIC & VISUAL AIR NAVIGATIONAL AIDS (NAVAIDS). A seldom employed composite term that includes two forms of Aids.
Reference: Airport Design 1980

GROUND AIDS TO A CONTACT FLIGHT. Term includes Day Marking Devices and "Luminous Devices."
Reference: PICA0 1944

GROUND-BASED NAVIGATION AIDS. Sources can present very different views of a term. A historical source applies this term to visual aids (entirely or nearly so) while a more recent source (Field) sees it as one form of Radio Navigational Aids (airborne representing the other form).
References: Wilson 1979, Field 1985

GROUND SYSTEMS. A somewhat vague term which one source apparently regards as a synonym for Nav aids.
Reference: Wilson 1979

LANDING AIDS. Library catalogues sometime employ this term in a general sense for nav aids (including radio). It is possibly a specialized term for Wilson which refers only to Approach Lights.
Reference: Wilson 1979

LANDING AIDS TO AIR NAVIGATION. CAA included only radio aids in what appears to be a general term. It also included radar.
Reference: CAA 1945

LANDING AIDS TO NAVIGATION. A general term though a Radio Aids focus is sometimes present.
Reference: Part J, 2002 (and references within that coverage)

LANDING & NAVIGATION AIDS. Topic heading in Index of IB, Vol I-X.
Reference: IB Index

MOBILE AIRFIELD LIGHTING SYSTEM. This term encompasses a full range of Lighted Aids.
Reference: Momberger 1986

NATIONAL AIRSPACE SYSTEM (NAS) GROUND-TO-AIR (G/A) SYSTEMS [LANDING SUB-ELEMENT]. National Airspaces Directorate (FAA) includes a Ground-to-Air Systems element which, in turn, is divided into sub-elements comprised of of specific Aids.
References: Part J, ICAO AT 1996, Grover 1957, Part V

NAVIGATION SYSTEMS. A term that may be overly vague for Navaids. However, Toshiba employs it for radio and visual aids; seemingly other elements are included such as radar. The term is viewed as the equivalent of Navaid.
Reference: Toshiba

PORTABLE HELIPORT LIGHTING SYSTEM. Term includes Heliport Light, Flashing Beacon, Heliport Approach Precision Indicator (HAPI).
Reference: Momberger AF 1986

RADIO & NAVIGATION AID SYSTEM. The meaning is not fully clear. It appears to refer to radio entirely (non-navaid radio and navaid radio). It may give a general appearance but only an appearance.
Reference: Wilson 1979

TEMPORARY AIRFIELD LIGHTING. Term is more a description of Emergency Airfield Lighting System (EALS) than established term.
Reference: EALS 1999

VISUAL AIDS FOR APPROACH & LANDING. This term is taken from the Committee of the same name.
Reference: Douglas 1979

1B2 Visual Aids Terms

GENERAL NOTE. These terms may encompass all forms of Visual Aids including types of Lights as well as Signs, Markers, Markings. Some uses are more limited in scope. Some terms do not include the word "Visual."

Reference: AIM 1991

AERO VISUAL LIGHTS/VISUAL AERO AIDS. Possible coined terms.

Reference: Part J

AERONAUTICAL LIGHTING & OTHER AIRPORT VISUAL AIDS. This "term" is a chapter heading in AIM 1991. It includes Airport Lighting Aids, Beacons, Course Light, Obstruction Lights, Signs & Marking Aids.

Reference: AIM 1991

AIRPORT VISUAL AIDS/AIRPORT VISUAL-AIDS SYSTEMS. These terms are presumably more explicit versions of the basic term (Visual Aids). McKelvey employs both forms. The second term is more precise since System is added to core term.

References: Maint of Airp Vis Aids Fac 1982, FR Arcata 1949, McKelvey JN 1987, Pollock AI 1990

AIRPORT VISUAL NAVIGATIONAL AIDS SYSTEMS. Overarching term which probably emphasizes lighted forms.

Reference: Warskow 1950

ALL-WEATHER VISUAL AIDS. Alternate name for Airport Lighting from a Swiss author.

Reference: Friedel AF 1986

AVIATION LIGHTING. Overarching term for aircraft and Ground Lights.

Reference: Breckenridge 1955

GROUND VISUAL AIDS. A variant of Visual Ground Aids. See also Visual Ground Aids.

Reference: ADM 1983

LAND AERODROME & AIRWAY LIGHTING. Term is from a publication title.

Reference: UK 1937

VISUAL AIDS. This term can include all visual forms. The term in some sources covers a smaller range of devices since those sources are limited in scope. In some instances Obstruction Aid forms have been excluded. Floodlighting is sometimes included.

Reference: Honeja 1993, Standby Power 1971, ADM 1983, Berry IT 1992, Warskow 1950, AD 1999

VISUAL AIDS FOR AIRPORTS. Term focusses on Approach and Runway Lights.

References: Douglas 1978, 1979

VISUAL AIDS TO AIR NAVIGATION. This term is a more precise version of the basic term that clearly denotes the type of Aids. The name stems from a committee experimenting with Nav aids at Arcata, CA. after World War II.

Reference: FR Arcata 1949

VISUAL NAV AIDS. This version of the basic term combines Visual with an abbreviated form of Navigation Aid: Navaid. It includes Approach and related Lights as well as Rotating Beacons. The source in question was restricted to those topics.

Reference: FAA ADS-Site 1980

VISUAL AIDS SYSTEM. A general appearing term with specific reference to Aids examined at Arcata: Approach, Runway, Taxiway, Threshold.

Reference: FR Arcata 1949

VISUAL GROUND AIDS. Does this term differ from Visual Aids? It would appear to be interchangeable since Visual Ground Aids is in the chapter title but Visual Aids in text. Does "Ground" make the basic term more precise? See Also:

Ground Visual Aids.
Reference: ADM 1983

VISUAL LANDING AIDS. Few details are available for this term. It may be a general term though it may refer to Approach Lights only. Landing Aids suggests a more general meaning or does it refer to Approach Lights only?
Reference: IB 2nd Air Navigation 1955, Douglas 1978, Warskow 1950

VISUAL AIR NAVIGATIONAL AIDS. Term includes facilities and equipment as well as lights, signs, markings and what it termed symbols.
Reference: ADS 1969

VISUAL SIGNALS. This term includes Stop Bars and Clearance Bars. The term may suggest traffic signals since such devices create stop and go movements.
Reference: ADM 1983

VISUAL LANDMARK. A UK term in ICAO whose meaning is not clear. It is not an official Navaid term (unless in UK).
Reference: AD 1958

1B3 Sub-Overarching Terms

General Note. These terms incorporate terms from two or more categories in the Chapter. They are considered in the appropriate segment. They are listed here as a type of sub-overarching term.

AGA AERODROME GROUND AID.
Reference: Clark IN 1993

APPROACH & LANDING SYSTEM.
Reference: Kendal 1990

APPROACH & NAVIGATION LIGHTS.
Reference: C-H 1991

APPROACH & RUNWAY LIGHTING/APPROACH & RUNWAY LIGHTING SYSTEM.

Reference: Idman, Denmark 1993 (1st), ADM 1983 (2nd)

APPROACH & THRESHOLD HIGH INTENSITY UNIDIRECTIONAL SEQUENCE-FLASHING LIGHTS.

Reference: ADB

APPROACH, THRESHOLD, RUNWAY LIGHT & RUNWAY MARKING.

Reference: Moore AW 1950

APPROACH, THRESHOLD, & RUNWAY END ELEVATED HIGH-INTENSITY LIGHT.

Reference: Idman

APPROACH/THRESHOLD/RUNWAY END ELEVATED LIGHT.

Reference: ADB

APPROACH/THRESHOLD/RUNWAY END INSET LIGHT.

Reference: ADB

APPROACH/THRESHOLD/RUNWAY HIGH INTENSITY UNIDIRECTIONAL ELEVATED LIGHT.

Reference: ADB

MEDIUM INTENSITY APPROACH, THRESHOLD, RUNWAY EDGE LIGHTING.

Reference: ADB

MISCELLANEOUS VISUAL APPROACH AIDS & AIRPORT BEACONS.

Reference: ADS-Site 1969

SEMI-FLUSH APPROACH & THRESHOLD LIGHTS.

Reference: Pollock AI 1990

1B4 Overarching Terms for Lighted Aero Navigation Aids

a) Light and Lighting Aids Terms

GENERAL NOTE. This group of terms constitutes only a small number of the fifty-some terms in the Lighted Aero Navigation Aids category. However, they represent over 40% of references in the surveyed sources (1st ed). The most commonly employed terms are general in nature and somewhat vague. They can function within an aero context though they are not free-standing in nature.

AERO LIGHTS. A term appearing in Part J. Possibly an authentic term though it may have been coined for the needs of that work.

Reference: Part J

LIGHT. This term can refer to physical apparatus. It can also refer to the emission of light energy. Usually the former meaning is intended unless the context is the production, emission of light energy. Light can sometimes take on a very general nature. Though in many instances it represents a short form for a specific type of Light (e.g., a discussion of Taxiway Lights may refer to them as Lights more often than as Taxiway Lights).

References: Whitnah 1966, Walker 1991, ADM 1983, AD 1999, Douglas 1979, D & B 1977

LIGHT SYSTEM. Term gives appearance of an overarching term though reference specifically applies to Approach and Runway Lighting.

Reference: Douglas 1979

LIGHTED AIDS FOR AIR NAVIGATION. Term appeared in one surveyed source. Term is a more precise version of basic term.

Reference: Breckenridge 1955

LIGHTING. This term can serve as a synonym for Airport Lighting. It can also be employed in a discussion of a specific form of lighting situation. The term usually refers to a group of lights of an integrated nature.

References: AD 1951, ADS AC 1970, Komons 1978, Keller 1992

LIGHTED AIDS. This term is included in only one surveyed source. It is a historic term of the late 1920s. It includes Boundary Lights, Range Lights, Illuminated Wind Cones.

References: Whitnah 1966

LIGHTING AIDS. This is an overarching term for all forms of Lighted Visual Aids. On occasion it may include non-lighted Aids.

References: IES 1972, ADM 1983, NOTAMS 1987

LIGHTING SYSTEM/LIGHT SYSTEM. This non-specific term is the most common overarching term (more than 10% of surveyed sources employed it). The term is often employed as a general term as well as some more restricted usages. AIP has both terms. They are apparently used as synonyms. See also: Light System.

References: Taylor 1958, AIP 1973, Idman, FR Arcata 1949, CD 1979, D & B 1977

b) Airfield and Airport Light/Lighting Terms

AERIAL LIGHTING. The original idea term emanates from marine aids to navigation. This is reflected from the placement of Airways Division in the Bureau of Lighthouses (Department of Commerce).

Reference: Komons 1978

AIR LIGHTS. Informal term for Airway Beacons and historic in nature.

Reference: Boone 1932

AIRFIELD LIGHTS. The term "Airfield" is comparable to Airport. While not exclusively employed in Europe it is more common there than elsewhere. At least one US military source employs the term. Are Airfield Lights different from Airfield Lighting? While there is a possible difference the terms seem similar: both refer to an integrated group of lights at an airfield/airport.

References: PICA0 1944, Idman, Keller 1992

AIRFIELD LIGHTING. This term refers to a group of integrated lights at an airfield/airport. Airfield Light may have the same meaning though it may also be more restricted in meaning. This term more strongly suggests a system of lights. References: NATO 1991, NavFacCom 1981, ADB, Thom, Danaid

AIRFIELD LIGHTING SYSTEMS. This term is similar to the previous term though the presence of System makes it more precise. Reference: Latest Dev. 1991, NavFacCom 1981

AIRFIELD GROUND LIGHTING. This term becomes more explicit by adding Ground to the basic term. The term is differentiated from terms relating to airborne aids. Reference: Cegelec

AIRPORT LIGHTING. A general term that in some instances includes flood-lighting and Obstruction/Obstacle Lights. The term presumably refers to a group of integrated lights at an airport. Airport Lighting is the most frequently cited term outside of Light/Lighting terms. References: ITTE 1962, Wood 1940, Glidden 1946, Godfrey, Warskow 1950

AIRPORT LIGHTING AIDS. This term includes the word "Aids" which is pivotal to overarching Aero Navaid terms. Three sources employed it in surveyed literature. AIM employs it as an encompassing term while AIP distinguishes it from Air Navigation and Obstruction Lighting. Douglass includes Approach and Runway Lighting within the term. References: NATO 1992, AIM 1991, AIP 1991, Douglas 1979

AIRPORT LIGHTING SYSTEMS. This term is similar to previous overarching terms. "System" makes the term more explicit. Airport Lighting is an integrated system of Aids at a given site. Manufacturers often employ the term. References: Omnipol, Glidden 1946, G.E.

AIRPORT GROUND LIGHTING EQUIPMENT. One surveyed includes the term which refers to physical apparatus. Reference: Cegelec

AIRPORT LIGHTING EQUIPMENT. This is a general term that centers on physical apparatus. It bears resemblance to Ground Lighting Equipment. Two of three surveyed users are manufacturers.

References: Leary 1985, H & P 1977, Omnipol

AIRPORT LIGHT PRODUCTS. Title of C-H catalogue that may qualify as a term indicating physical apparatus.

Reference: C-H 1991

AIRPORT LIGHTS. This may refer to a single apparatus though it is probably employed at times as a systems term. PICA0 employs both Airfield Lights and Airport Lights.

References: PICA0 1944, Keller 1992

AERODROME LIGHT SYSTEMS. Aerodrome is a common term in British English though infrequent in Air Navaid terms. This term is seemingly the equivalent to Airport Lighting Systems.

Reference: ADM 1983

AERONAUTICAL GROUND LIGHT. This term is defined as any Light that serves specifically as an Aid to Air Navigation (excludes lights on aircraft).

Reference: AD 1999

AERONAUTICAL GROUND LIGHTING. This term applies to all devices intended as Aids to Air Navigation that are external to aircraft.

Reference: NATO 1992

AIRPORT & AIR NAVIGATION LIGHTING & MARKING AIDS. A long term in PHAK that encompasses all forms of Visual Aids. It specifically refers to chart markings.

Reference: PHAK 1971

AIRPORT LIGHTING FOR SMALL AIRPORTS. An overarching term for smaller airfields. It includes Wind Cone in Segmented Circle.

Reference: Warskow 1950

AIRWAY LIGHTING. This is seemingly a general term and not restricted to Airway Beacons.

Reference: Black 1929

AIRWAY LIGHTING EQUIPMENT. This refers to all forms of Lighted Aids.

Reference: Leary 1985

AVIATION GROUND & SEADROME LIGHTING. A double term that encompasses the subject field. The more common practice is to use a single term.

Reference: ATA 1946

AVIATION GROUND LIGHTING. For IES 1987 this term focusses on Ground Lights and excludes Obstruction Lights. However, NATO includes all forms.

References: IES 1987, NATO 1992

AVIATION LIGHTING. This term can include both aircraft and A/N terms. The term as employed by one source encompasses aircraft lighting and Nav aids in three parts: airport, heliport, obstruction. A second source uses it as a general term in a context of a discussion of optics and related issues.

Reference: IES 1966, D & B 1977

AVIATION LIGHTING EQUIPMENT. A term that focusses on physical apparatus and is the title of a C-H catalogue.

Reference: C-H 1962

AVIATION LIGHTING SYSTEMS. A manufacturer employs this term as an overall term for its lighting products and engineering systems work.

Reference: ADB

FIELD-LIGHTING FOR AIRPORTS. This term is an overarching equivalent of Airport Lighting. Over the years IES has employed a variety of alternate terms including this term.

Reference: IES 1947

FIXED LIGHTS. Term refers to a light emitting a steady intensity when concealed from a fixed point.

References: AD 1971, -1991, -1999, Lexicon 1986, PICA0 1944

GROUND LIGHTING. For IES this term is a short form of Aviation Ground Lighting. For Harper it is possibly interchangeable with Airport/Aerodrome Lighting and Beacons.

References: Harper 1938, IES 1987

GROUND LIGHTING AIDS. ADM 1983 employs this term to distinguish Air Nav aids from aircraft-based lights.

Reference: ADM 1983

GROUND LIGHTING TO AID NAVIGATION. This term is the equivalent of Airport Lighting.

Reference: IES 1972

GROUND-POSITIONED LIGHTING. A questionable term; it is an aspect of older Glide Slope Indicators and not an Aid in itself.

Reference: Cook 1960

LANDING LIGHTS. This term possibly refers to aircraft landing lights or to aircraft based-lights (Potts). For Greif it is an historic term referring to flush or semi-flush Lights that denote landing direction.

References: Potts 1994, Greif 1979, NavAer 1946

LIGHTING/MARKING/LIGHTING & MARKING. Sub-overarching term for Visual Aids.

Reference: Airports Served By 1971

LIGHTING & MARKING SYSTEM. Finch offers a variant form by adding system to core term.

Reference: Finch 1961

MARKING & LIGHTING/MARKING & LIGHTING SYSTEMS. The first term goes beyond scope of Lighted Aids though it apparently does not include all forms.

Reference: The Development of ... IB 1953

NAVIGATION LIGHTING. This term is very broad in scope: road, rail, marine and aero forms are included.

Reference: Cayless 1983

PASSIVE AIRPORT LIGHTING. This refers to reflectors not to actual lighting apparatus. A possible sub-overarching term.

Reference: Potts IJ 1994

POWERED LIGHTING SYSTEMS. This term includes active aids. Cp passive Passive Airport Lighting.

Reference: Potts IJ 1994

SIGNAL LIGHTS. Term possibly refers to ATC equipment.

Reference: Warskow 1950

SIGNAL LIGHTING EQUIPMENT. Term refers to physical apparatus rather than to morphology.

Reference: IES 1952

SYSTEM OF LIGHTS. Specific reference is to Taxiway Lights including Signs that are presumably lighted.

Reference: IES 1966

VISUAL TRAFFIC CONTROL AIDS. This frequently employed term includes Taxiway Lights, Route Marking, Signal Lights.

Reference: Warskow 1950

1B5 Color & Other Messages

General Note. The Database primarily lists and describes T-M phenomena terms.

These terms include physical, morphological and systems terms. However, messages produced by means of T-M are also a vital element in the process. This is particularly the case with color and its meanings. Therefore, this segment will list colors in use and meanings. It also includes historic color usage. A review of contemporary practice is also included. That review focusses on FAA and ICAO practices.

a) Colors

General Note I. Terms and meanings are the core of the T-M Database including messages and the means of producing messages. Messages could easily become an overly long and complex topic which goes beyond the focus of the study. An effort has been made to limit listing of terms, summaries of messages.

Colors are listed by basic and major colors, specialized color usages and group color practices. A summary of messages is included. Visual messages pertain primarily to Chapters 1 and 3. Visual and aural aspects of Radio Aid messages are considered in Chapter 2.

General Note II. Colors are formulated for specific uses. For example, color limits for railway Signals are at variance with those in aviation colors. Core terms on occasion add "aviation" to the color name.

1) Single Colors

YELLOW. The primary meaning of yellow is that of caution. This is true in most modes of transportation. However, that is only partly true for Aero Nav aids. Yellow is employed in Beacons, Runway Lighting and other purposes where a cautionary message is not present to a significant degree. Other uses are clearly cautionary (e.g., Clearance Bar Lights, Holding Position/Runway Lights).
References: FR Arcata 1949, Mil Spec 1963, NATO 1992

AMBER. This term can be viewed as an adjunct of Yellow. Though a description of it can be problematic. A discussion of the issue is found in Part F. Amber can be viewed as a less saturated Yellow hue. It appears in some historic usages as

well as contemporary uses including some Final Approach Indicators.
References: Clark 1981, Seg Circ Airp Mkngs 1963, C-H, G.E. Manairco,
Glidden 1946, Norvell AC 1940, Solium 1939

BLUE/BLEU GLASS FILTER. Blue generally has only limited uses in T-M. It is a secondary color in those modes where it is used. It has been employed for Taxiway Lighting since the 1930s. The addition of Taxiway Centerline Lighting (employing Green and some use of Yellow) has diluted that role.
References: IES 1947, FR Arcata 1949, Mil Spec 1963, NavAeroDesign 1946 (2nd term)

RED. Red has a long-enduring meaning of danger or warning. Historically it has carried that meaning into Aero Nav aids. However that meaning has been lessened by selective use of Red in Approach Lighting (and in the partial usage of White for Obstruction Lighting).
References: Caldwell 1930, Leary 1985, Duke 1927, CAA 1941

AVIATION RED. A more official term for the Red employed in Aero Nav aids.
References: OML 1970, Seaplane Bases 1994

AVIATION GREEN. A more precise term for the Green used in Aero Nav aids.
Reference: Seaplane Bases 1994

AVIATION YELLOW. A more precise term for Aero Nav aid Yellow.
Reference: Seaplane Bases 1994

RUBY GLASS/RUBY GLASS GLOBES. A historic term that remains within the Red color spectrum. It was employed in Obstruction Lighting in the 1930s.
References: Caldwell 1930, the Lighting of ... AC 1928

GREEN. Green at one time was a color of caution. It has become a readily recognized message of clear/proceed/safety. That meaning is found in Aero Nav aids though somewhat muted. It is employed with Threshold, Runway Edge Lights where it emits a proceed message. That message is less evident in Taxiway Centerline Lighting, various Beacons, some Final Approach Indicators.

References: IES 1952, Whitnah 1966, Norvell AC1941, Sharp 1944, Black 1929, FR Arcata 1949

WHITE. This color constitutes the most complex color and message patterns among Aero Navaid colors. Some sources of this color are incandescent light globes while other sources include xenon gas tubes that alter the hue. At one time white was a clear or proceed indication (in Railway Signals). It no longer has that meaning for general use in T-M. It can have various meanings according to use. References: Cayless 1983, St John Sprigg 1934, Finch 1938, Mil Specs 1963

AVIATION WHITE. A more precise designation for Aero Navaids white. References: OML 1991, Hi Int Rnwy L Sys 1973

AVIATION VARIABLE WHITE/VARIABLE INTENSITY WHITE/VARIABLE WHITE/VARIABLE-WHITE. These terms refer to white produced by various means including xenon flashcubes. References: ADS 1951, IES 1981

WHITE HOT/BRIGHT WHITE. These descriptive terms apply to strobe beacons in an early/earlier state of development. They may lack a formal status. Reference: Christian AW 1956

WHITE (NATURAL SUNLIGHT). Term refers to color produced by a Strobe Lamp. Reference: Sola Basic

CLEAR/CLEAR GLOBES/CLEAR PRISMATIC GLOBES/CLEAR LENS. Clear can be used to designate White. Clear Globes and Clear Prismatic Globes refer to physical dimension of light emissions when color filters are absent. References: Glidden 1946, NavFacEngCom 1981, ATA 1946, Specs Seq Airp L 1975

CLEAR (WHITE) LIGHT/CLEAR WHITE/WHITE (CLEAR)/CLEAR LIGHT. Terms that bring together two key elements for color: White and Clear. References: Mil Spec (1st, 3rd), Multi Electric (2nd), Kroger AW 1948

BLUISH WHITE. Toshiba so labels the color hue for RTIL.
Reference: Toshiba

2) Color Combinations

General Note. Two or more colors can be employed together. These uses and meanings can be complex. For example, Final Approach Indicators may use red and white to denote aircraft is on glidepath, above, below. Red and white with Threshold Lights can denote approach direction (white) and red for wrong direction. Individual entries can indicate actual color usage.

Principal color combinations include:

White/Green	White/Yellow	Red/Yellow	Red/White
Red/Green	Clear/Green	Yellow/Red	Green/Yellow

Day Color Usage:

General Note. Signs and Markings color usage partially mirror night uses. Colors are included in entries. White is a significant color for surface markings. Yellow and Black are common combinations in colors for Signs. Older sources frequently refer to Chrome-Yellow. Black is sometimes referred to as Dull Black or Dead Black. Orange and permutations are employed in Obstruction Markings.

INTERNATIONAL ORANGE. References: Norvell AC 1940, Sharp 1944,
Godfrey

ORANGE. References: IES 1981, AD 1990

AVIATION ORANGE. References: IES 1981, OML 1973, 1991

BLACK/YELLOW. Reference: Komons 1978

BLACK/CHROME-YELLOW. Reference: Whitnah 1966

CHROME-YELLOW/DEAD BLACK. Reference: Black 1929

CHROME-YELLOW/BLACK. Reference: Young 1928

CHROME-YELLOW/DULL BLACK. Reference: Air Marking AC 1927

b) Historic Uses

General Note. These uses are for the most part at variance with current practices. In most instances the type of Light is no longer employed.

BOUNDARY LIGHTS. This Aid employed the color White for outlining the landing area.

Reference: Glidden 1946, Wood 1940, AD 1951, CAA 1941

RANGE LIGHTS/RANGE-LIGHTS. These Lights were Green in color. They denoted the best approaches for landing. Range Lights were inserted in Boundary Lights apparatus.

References: CAA 1941, AD 1958

c) Contemporary Usages

General Note. These terms with colors and meanings are extrapolated from appropriate categories in Database. Further details are in those categories including references.

APPROACH LIGHTING

MEDIUM INTENSITY. White, steady burning lights in light bar configurations. They may include sequenced flashing lights.

HIGH INTENSITY. Steady-burning white lights are augmented by red steady-burning lamps. Sequenced flashing lights are also present.

BEACONS

General Note. Beacons for airports, heliports, identify those installations. Colors and meanings do not closely cohere with established meanings of those colors. Sources for color meanings are mostly from FAA, ICAO.

White and Green: Lighted land airports (can be green only)

White and Yellow: Lighted water airports (ICAO: white only)

Green, Yellow, White: Heliports (ICAO: white only)

These lights are flashing rather than steady-burning.

FINAL APPROACH LIGHTING.

General Note. This is the most complex aspect of messages. Part G offers

extensive coverage of the matter; these remarks are a summary.

VASI. Color coding is primary with white denoting above approach level, red and white on approach, and red only below the correct level.

T-VASI. Pattern coding is primary and color coding is secondary. "T" in various permutations are displayed in white. Far below approach results in red "T". This is termed the "gross undershoot signal."

PAPI. Two R/Two W on. W denotes degrees above; R below.

PLASI. Steady W on; Steady R well below; increasingly pulse denotes degree of deviation.

TRI-COLOR SYSTEM. Amber above, Green on, Red below

OBSTRUCTION LIGHTING. Historically flashing and steady-burning and red lights have been employed. Newer forms include strobe lights that can be white in color rather than red.

Runway & Taxiway Lighting

TAXIWAY LIGHTING. Blue has been historically associated with Taxiway Lighting. The addition of Taxiway Centerline Lighting has changed that perception. Green -- not Blue -- is employed for that purpose. Alternating green and yellow lights are employed at Taxiway Intersections. Green lights are flashing while Yellow Lights are steady-burning (or fixed) lights.

CLEARANCE BARS & RUNWAY GUARD LIGHTS. Both terms employ yellow and in a cautionary manner. Clearance Bar Lights are steady-burning while Runway Guard Lights are flashing.

STOP BAR LIGHTS. This Aid controls runway intrusions. They display steady-burning red lights which are both in in-pavement and elevated forms.

RUNWAY CENTERLINE LIGHTING. This form of Lighting uses white, steady-burning lights. However, lower end lights are alternating red and white; lowest end lights are red only.

TOUCHDOWN ZONE LIGHTING. These are white, steady-burning white

lights. They are arranged in two rows of transverse light bars.

TAXIWAY LEAD-OFF LIGHTS. This Light form appears to correspond to Taxiway Exit Lights of ICAO. They too display green and yellow alternating lights.

LAND & HOLD SHORT LIGHTS. These lights are found at hold short point display pulsing white lights.

RUNWAY EDGE LIGHTS. These lights are steady-burning white lights. On instrument runways the last 2000 feet are in yellow. A possible cautionary message is suggested by this usage.

RUNWAY END LIGHTS/THRESHOLD LIGHTS. These are separate Aids according to function but often occupy reverse sides of the same fixture. Runway End Lights are red and denote end of the runway and have a traditional meaning of danger, hazard. Threshold Lights are green in color and have a proceed, clear message.

1C Beacons and Obstruction Lighting

General Note. Beacons and Obstruction Lighting are sufficiently different from other forms of Visual Aero Nav aids to constitute a separate category. Both are often stand-alone forms rather than groups of Lights. Obstruction Lighting, though a relatively small group, is too large and significant to be placed in a catch-all miscellaneous group. Many Obstruction Lights are of the Beacon form and are therefore closely related to the former category. This coverage is divided into Overarching, Physical, Morphological, Miscellaneous and Obstruction forms.

1C1 Overarching Terms

BEACONS.

General Note I. The term Beacon is a basic term for many forms of T-M. It has special significance in marine and aero forms. Lighted forms can be divided into Signal and Beacon forms. The former have changing messages; the later unchanging messages even if complex. The term Beacon has multiple and even confusing uses in Aero safety aids. It can be a sub-overarching term. It can also be a short form of many more explicit terms. This coverage has a general character and, admittedly, presents a welter of meanings.

General Note II. The most common meanings are those of Airport Beacons and Airway Beacons or Beacons. These were sometimes viewed as an aero and land form of the marine lighthouse. Some European nations employed the term Aerial Lighthouses (sometimes abbreviated to Beacon).

Obstruction or Hazard Lights or Beacons are not infrequently listed as Beacons. The various uses often center on a powerful light that flashes or rotates/revolves surmounting a tower or other distinctive elevation.

FAA employs Beacon as a virtual sub-overarching term. It is increasingly employed as the basic term with various uses subsumed within it.

PICAO 1944 offers a definition of Beacon which continues to have significance: The Beacon is a light that can be seen at all azimuths. This visibility can be

achieved through optics or motion. The light denotes a specific point. Types of Beacons include Airfield Beacon, Airway Beacons, Auxiliary Beacons, Code Beacons, Hazard Beacon, Oscillating Beacon, Rotating Beacons.

Classification #: 323

Form of Device: Lighted Aero Aid

Operation: Flashing or revolving that can be seen in all directions.

Comments: Broad range of current and past Beacons subsumed under single title.

See Also General Notes and entries

References: PICA0 1944, Blee 1929, Norvell AC 1941, Whitnah 1966, Ap L Eq 1989 among many sources

AERODROME BEACON. Aid denotes location of Aerodrome (UK English).

Reference: Lexicon 1985, AD 1999, ADM 1993

AERONAUTICAL BEACON. This term seems to be an overarching term for Aids denoting a specific geographical point. Beacon in ICAO expands on the shorter definition of Aeronautical Beacon.

References: AD 1951, 1971

AERONAUTICAL LIGHT BEACON. A generic term for all forms of Beacons in aviation service: airport, heliport, landmark, airways, obstructions. Meaning denoted by color(s) employed. Seemingly a single source uses the term.

Reference: AIP 1999

AIR BEACON. Possibly another term for Aerial Lighthouse. A historic term.

Reference: Finch 1938

AVIATION BEACON. An infrequently used term that appears to encompass many forms of Beacons including those for airports, airways, Hazard Beacons.

Reference: Crouse-Hinds 1954

BEACON AIDS. Terms appear in Part J and may have been coined for that study. Aid was added to various terms.

Reference: Part J

BEACON, HIGH INTENSITY. This term may have a specific meaning rather than act as an overarching term. Few details are included.
Reference: Crouse-Hinds 1954

BEACON LIGHT. This term appears to be an informal, descriptive term for one or more types of Beacons (Airway, Airport, Route Beacons).
References: CAA 1947, CAA 1945, Black 1929, Duke 1927

LIGHT BEACON. Do inversions of “Light” and “Beacon” alter the meaning? This is possible though that is not certain. Most references are to Airway Beacon though the term seems to include other uses.
References: CAA 1945, Black 1929, Taylor 1948

1C2 Physical Apparatus

a) Method of Operation-Related Terms

AIRPORT 36” ROTATING BEACON. The word Airport is added to basic term which is at variance with common practice.
Reference: Stand Spec for Constr Airp 1959

ROTATING BEACON. The type of operation (rotating light apparatus) is incorporated in the title. Rotating Beacon is a primary term that includes various functions (e.g., Airport and Airway Beacons).
References: CAA 1945, ADS-Site 1980, Black 1929, Komons 1978, Warskow 1950

FLASHING BEACON. This form of Beacon is less often employed than Rotating Beacon. In this form the light apparatus mechanism interrupts the passage of light energy creating the desired number of flashes in a given period of time. Flashing Beacons include Airport Beacon, Airway Beacon among various Beacon types.
References: Solberg 1979, Glidden 1946, CAA 1945

ROTATING BEACON FOR SMALL AIRPORTS. A single source supplies this

term. The inner apparatus revolves though not the entire mechanism. It may be an obsolete term.

Reference: GE 1966

ROTATING LIGHTS. An informal, descriptive term for Airport Beacons in the 1930s.

Reference: Mola 2003

ROTATING ELECTRIC BEACON. This term refers to an Airway Beacon. Only one surveyed source included it though it seems of sufficiently general character to be found elsewhere in the literature.

Reference: Komons 1978

ROTATING LIGHT BEACON. This term which also refers to an Airway Beacon. The term has potential for broader use.

Reference: Komons 1978

REVOLVING BEACON. The term “revolving” may be identical to that of “rotating.” The former term is infrequently employed and often historical. One source refers simply to Airway Beacons while a second designates Airway Beacon with Revolving. CAA divided Airway Beacons into Flashing and Revolving forms.

References: CAA 1945, Duke 1927, Davies 1972, P & B 1988

OSCILLATING BEACON. The nature of the oscillation is that of an undulating beam. The beam is achieved by “periodic motion of the light source near the focal point of the optic.”

Reference: PICA0 1944

b) Dimension-Related Terms

General Note. Many Beacon forms include the diameter of the device in the title. This may be a past practice more than a present one. Intensity and light source are now more significant. In many instances the terms refer to a specific function so that the terms are also morphological. These entries are frequently short.

10-INCH ROTATING BEACON. Aid is designated FAA L-801 employed in airport medium intensity lighting.
Reference: ADS-Site 1969

18-INCH BEACON. This Beacon is of smaller size than many forms. It is a historic reference to emergency field Beacons of the 1920s.
Reference: Breckenridge 1955

24-INCH AIRWAY BEACON. Variant term which includes function of Beacon in title.
Reference: Breckenridge 1955

24-INCH BEACON/TWENTY-FOUR-INCH BEACON/24-INCH-DIAMETER BEACON/TWENTY-FOUR-INCH BEACON. These are largely historic in character and refer to airport, airway or emergency field functions.
References: Duke 1927, Glidden 1946, Black 1929, Leary 1985

TWENTY-FOUR-INCH DOUBLE-END ROTATING BEACON. Many traditional Airport Beacons were double-ended with fresnel lenses. Few terms include that information in the title. This version consists of two single-end units back to back. The term is subsumed under Airport Beacon for CAA.
Reference: CAA 1947

24-INCH BEACON ROTATING BEACON. Most of these Beacon forms rotate though only infrequently is the fact of rotating incorporated into the title.
Reference: Black 1929, Duke 1927

24-INCH DOME/24-INCH DOUBLE END/36-INCH DOUBLE END/24-INCH SINGLE END. Models of Rotating Beacon described by diameter and number of ends.
Reference: CAA 1953

ROTATING 24-INCH BEACON. Obstruction Beacon with 12 fpm in red.
Reference: IES 1972

BEACON, 36-INCH ROTATING BEACON. An alternate term of a more bureaucratic configuration.
Reference: Ap L. Eq 1966

BEACON, 36-INCH, DOUBLE-END TYPE. A federal term beginning with the general term to which particulars are given.
Reference: CAA 1948

CAA-291 36-INCH ROTATING BEACON. A fuller form of the basic title that includes the specification designation as part of the title.
Reference: GE 1966

FOUR-BEAM 24-INCH BEACON. Is this a formal name or a descriptive term?
Reference: Breckenridge 1955

36-INCH BEACON. This term appears to refer to floodlights as well as Airport Beacon usage.
Reference: Davies 1972

36-INCH DOUBLE END, ROTATING BEACON/36-INCH DOUBLE-END ROTATING BEACON. These terms are variants of the basic term. CAA supplied the first term. Westinghouse, formerly a major navaid source, contributed the second.
Reference: Westinghouse, CAA 1941

36-INCH ROTATING BEACON. A basic term for an essential Airport Beacon. The title is employed by several manufacturers.
Reference: Westinghouse

36" ROTATING BEACON. This form conforms to Beacon, 36-inch Double End.
Reference: CAA 1948

36-INCH REVOLVING BEACON. This Aid is located at landing fields of the airway system. It is a descriptive term rather than a formal title. The Beacon is

described as a “36-inch, 500,000 candle-power revolving beacon.”

Reference: Davies 1972

THIRTY-SIX-INCH SPHERICAL ROTATING BEACON. This represents one form of Airport Beacon. It is also referred to as Dome Beacon.

Reference: CAA 1953

DOUBLE-ENDED 36-INCH DIAMETER BEACON. One of two forms of Airport Beacon.

Reference: Glidden 1946

DCB 36-INCH ROTATING BEACON/DCB ROTATING BEACON/DCB ROTATING-10 BEACON. These terms refer to product designations.

Reference: GE 1966

c) Energy Source-Related Terms

General Note. Older forms of Aero Nav aids not infrequently included the energy source in the title. This is certainly the case with Beacon. The following entries are often short since the focus is on the morphological dimension.

ACETYLENE BEACON. Term refers to Airway Beacon.

Reference: Leary 1985

ACETYLENE GAS BEACON. A form of Airway Beacon. Energy source included in title. See also: Electric Beacon.

Reference: Whitnah 1966

ELECTRIC BEACON. A form of Airway Beacon. Energy source included in title. See also: Acetylene Gas Beacon

References: Komons 1978, Whitnah 1966

ELECTRIC BEACON LIGHT. A somewhat informal term for Airway Beacon.

Reference: Flight: The Story of El Nav 1971

ELECTRIC LIGHT BEACON. A historic term that refers to Airway Beacons.
Reference: Komons 1978

FLASHING GAS BEACON. Davies refers to Airway Beacons with this term.
Reference: Davies 1972

GAS BEACON. Historic term that refers to Airway Beacons.
Reference: Komons 1978

GAS FLASHING BEACON/GAS-FLASHING BEACON. Both terms refer to Airway Beacons where electricity is not available.
Reference: Duke 1927

1C3 Morphological Terms

a) Airport Beacons

1) Airfield & Airport Beacons

General Note. Airport Beacons are employed as an overarching term for Lighted Aids found large at airports. They are also in use at heliports and seaplane bases. The term also includes Identification and Code Beacons which may not always be located at airports.
Reference: P & B 1988

AERODROME IDENTIFICATION BEACON. Term comparable to Airport Identification Beacon.
Reference: P & B 1988

AERONAUTICAL BEACON LIGHT. The term refers to Airport Beacons. It can also refer to Auxiliary Beacons and Course Lights. A historic term.
Reference: Blee 1929

AIRFIELD BEACON LIGHT. Term refers to Airport Beacons; also Auxiliary Beacons, Course-Lights. Historical term.

Reference: Blee 1929

AIRPORT/HELIPORT BEACON. Overarching term for two Beacon forms.
Reference: AIM 1999

AIRPORT IDENTIFICATION BEACON. A current FAA term. Six to eight words are flashed per minute. A word is a 3/4 Morse code alphanumeric identifier. The flashes are in green. It corresponds to the Code Beacon.
Reference: Spec for Airp & Helipt Bn 1984

AIRPORT (LAND) BEACON/AIRPORT (WATER) BEACON. The CAA in describing Code Beacon speaks of Airport Beacons as being of land or water forms.
Reference: CAA 1942

ALT GREEN/WHITE BEACON//ALT YELLOW/WHITE BEACON. The color schema denoted Land, Water Airport/Aerodrome Beacons.
Reference: ADM 1993

CIVIL AIRPORT LIGHT BEACON. FAA distinguishes between civil and military forms. There are high intensity and medium intensity forms.
Reference: Spec for Airp & Helipt Bn 1984

MEDIUM INTENSITY AIRPORT BEACON. FAA distinguishes between intensity of apparatus. This form has alternating green and white flashes (24-30 fpm).
Reference: Spec for Airp & Helipt Bn 1984

MILITARY AIRPORT BEACON. Beacon displays green and white alternate flashes as do Civil Airport Beacons. However, Military version adds two quick "dual peaked white flashes between green emissions."
Reference: AIM 1973

ROTATING SEARCHLIGHT BEACON. Term refers to physical apparatus for Airport Beacon.
Reference: Blee 1929

2) Code Beacons

CODE BEACONS. This Beacon identifies Airports and Landmarks. The Beacon emits coded messages in Morse Code. The term has also identified Airway Beacons. The Beacon is a long-enduring Aid consisting of Fresnel lens of a stationary nature with flashing messages. It is also a physical entity and finds other uses including Airport Beacons and Hazard Beacons. In some situations it marked airports when the actual Airport Beacon was away from the airport. References: CAA 1941, CAA 1958, AIM 1999, MP 1999

AIRPORT CODE BEACON. A fuller, more explicit title though Code Beacon is the basic form. This term is more restricted as it pertains only to airports. Reference: CAA 1941

AIRPORT ROTATING BEACON. This is the full title for FAA-approved Airport Beacons and found in older sources. Newer sources refer either to a Beacon which can be rotating or flashing. This Beacon is sometimes divided into 10 and 36 inch diameter sizes. References: ADS-Site 1973, Airport Design 1989

AUXILIARY AIRPORT BEACON. The source so describes this Beacon that it appears to be a Code Beacon. Reference: Norvell AC 1941

AUXILIARY BEACON. PICA0 refers to an Auxiliary Beacon as one employed in conjunction with a primary Beacon thereby completing the message. Reference: PICA0 1944

AUXILIARY CODE BEACON. CAA speaks of this as a Flashing Auxiliary Beacon, and Code Beacon in addition to Auxiliary Code Beacon. It is auxiliary to the Airport Beacon. The Code Beacon is added at the Airport when the Airport Beacon is away from the Airport. Both are found at the airport in some cases. The Beacon displayed green and coded flashes. Reference: CAA 1941

AUXILIARY AIRPORT CODE BEACON. This term adds location to the title.
Reference: Westinghouse

AUXILIARY GREEN CODE BEACON. The color is added to the title. This version marks an airport where the Airport Beacon is more than 1.25 miles away.
Reference: CAA 1953

ELECTRIC CODE BEACON. This term suggests that there are multiple energy sources since a specific energy source is added to the basic name.
Reference: CAA 1953

FLASHING CODE BEACON/FLASHING-CODE BEACON. CAA refers to one Obstruction Light by this title. Other Code Beacons also flash but this form is within the Obstruction Lighting category. Glidden adds a hyphen form for a Code Beacon at an airport when the Airport Beacon is away from the airport.
Reference: CAA 1953, Glidden 1946

FLASHING GREEN BEACON. The color is added to title of what appears to be a Code Beacon.
Reference: IES 1966

IDENTIFICATION BEACON. This can refer to a more-than-a single function Aid. A major role is that of airport identification. It is similar in appearance to the old Code Beacon apparatus. The third source notes that it displays a coded message for "point of reference" identification.
Reference: Thorn, NATO 1992, Lexicon 1985

IDENTIFICATION (CODE) BEACON/IDENTIFICATION CODE BEACON. Both terms add the function of identification to the title and they both tend toward historic usage. Sharp places it within Airport Beacon category. It identifies an Airport and it is also utilized when an additional airport is nearby.
Reference: Sharp 1944, IES 1947

LONG RANGE BEACON. A historic term that refers to Airport Beacon.

Reference: Black 1929

ROTATING AIRPORT BEACON. Alternate form of Airport Rotating Beacon. The term appears in somewhat older FAA sources.

Reference: Airport Design 1973

ROTATING BEACON FOR SMALL AIRPORTS/AIRPORT ROTATING BEACON FOR SMALL AIRPORTS. Both terms refer to reduced sized Beacons for less complex levels of aviation. The GE form had an inner rotating apparatus while the larger unit remained stationary.

References: CAA 1948, GE 1966

b) Airway Beacons

ACETYLENE GAS BLINKER. Colloquial term of Art Johnson. This is seemingly a term for Route or Routing Beacon which were spaced three miles apart.

Reference: Johnson 1971

AIRWAY BEACON. Airway Beacons marked air routes for many years. This was a major Air Navaid in the past but only remnants remain. They often had the form of Rotating Beacons though the Code Beacon type was also employed.

References: CAA 1942, PICA0 1944

AIR-WAY BEACON. A slight alteration of the basic term.

Reference: Finch 1938

AIRWAY BEACON LIGHT. A permutation of Airway Light Beacon.

Reference: Finch 1938

AIRWAY LIGHT BEACON. This term is a more explicit form of the basic term. CAA described it as providing "Visual Directional Guidance."

Reference: CAA 1958, CAA 1963

AIR-ROUTE BEACON. This is the equivalent of an Airway Beacon.

Reference: Caldwell 1930

AUTOMATIC ROUTING BEACON. This version of the Routing Beacon was clock regulated and lacked a caretaker.

Reference: Air Mail Service 1926

AUXILIARY BLINKER LIGHT. This term appears to approximate Route or Routing Beacons. Such lights were placed three miles apart on early air routes.

Reference: Finch 1938

AVIATION ROUTING BEACON. These are small Beacons set three miles apart.

Reference: Night Mail 1933

COURSE LIGHT/COURSE-LIGHT. These Aids are associated with the Lighted Airway System. Two such Lights indicate airway course in each direction. Blee and Breckenridge 1955 offer a hyphenated version.

References: AIM 1999, Johnson 1971, Blee 1929, Breckenridge 1955

FIXED COURSE LIGHT. This is seemingly an alternate name for the Course Light.

Reference: Komons 1978

ELECTRIC ROUTING BEACON. A term that includes the energy source.

Reference: Leary 1985

EN ROUTE BEACON. A term that refers to Airway Beacons (18" & 24" diameter types).

Reference: Johnson 1971

GAS ROUTING BEACON. A second form that includes the energy source in the title. No caretaker for this installation. Gas supply lasted for fourth months.

Reference: Leary 1985, Air Mail Service 1926

LIGHTED AIRWAYS. This may be a debatable term. It refers more to airways that are lighted than Lighted Aids marking the airway routes.

Reference: Breckenridge 1955

ROUTE BEACON. Route Beacon and variations were often employed for early Airway Beacons. Few details are available in this form.
Reference: Black 1929

ROUTING BEACON. Glidden views this as an Airport Beacon. The meaning of the term for other sources is not clear though Route and Routing Beacons frequently serve as Airway Beacons.
References: Glidden 1946, Leary 1985

SPERRY AIRWAYS BEACON. The manufacturer's name is included in the title.
Reference: Black 1929

c) Heliport Beacons & Other Forms

HELIPORT BEACON. This is the equivalent of the Airport Beacon. It emits a message of alternating green, yellow, and white flashes.
References: IES 1981, ADB

HELIPORT IDENTIFICATION BEACON. This term is akin to the Airport Identification Beacon and related to Code Beacon.
Reference: HD 1977, HD 1994, AD 1995

HIGH INTENSITY HELIPORT BEACON/MEDIUM INTENSITY HELIPORT BEACON. FAA provides lower and higher cp versions. They emit green, yellow, white flashes at a rate of 30-45 fpm.
References: Specs for Airp & Helipt Bn 1984

HELIPORT ROTATING BEACON. ADB describes this Aid as both an identification and location aid. Heliport Beacon has the same meaning for ADB.
Reference: ADB

IDENTIFICATION BEACON FOR HELIPORT USE. An alternate title provided by a maker of Air Nav aids. It has three heads or light units and revolves 12 rpm which translates into 36 fpm (flashes per minutes).

Reference: Manairco

REVOLVING PROJECTOR TYPE OF BEACON. Term is more descriptive than formal. It was employed for airway routes and emergency fields.

Reference: Air Mail Service 1926

ROTATING HELIPORT BEACON. This apparently has the meaning of Heliport Identification Beacon.

Reference: C-H 1991

SEAPLANE BASE IDENTIFICATION BEACON. Aid is equivalent of Code Beacon. Message is in yellow (6-8 alphanumeric characters per minute).

Reference: Specs for Airpt & Helipt Bn 1984

SEAPLANE BASE LIGHT BEACON. Term refers to a Beacon that identifies a Seaplane Base. It is a variant form of the Airport and Heliport Beacon category.

References: Specs for Airp & Helipt Bn 1984, HD 1994

HIGH INTENSITY SEAPLANE BASE BEACON/MEDIUM INTENSITY SEAPLANE BASE BEACON. Both forms emit alternate white and yellow messages (24-30 fpm). High intensity is 75000 cp; medium has 50000 cp.

Reference: Spec for Airp & Helipt Bn 1984

STOLPORT BEACON. An Aid under development in 1970. The outcome of that development is not known.

Reference: Stol Port 1970

1C4 Miscellaneous Forms & Support Structures

a) Miscellaneous Forms

APPROACH LIGHT BEACON. ICAO employs Beacon rather than Light for this strobe light apparatus. It has white flashes at a rate of 60 fpm.

Reference: AD 1971, Lexicon 1986

B.B.T. FLASHING-BEACON. A historic term with few details available. Term includes maker's name of the Beacon. It has a 25 mile range and can display Morse Code messages.
Reference: Duke 1927

CLUSTER BEACON. A historic term. It consisted of four lower cp lamps clustered together to form one unit. Lamps were of an automobile type. It was made by GE. The Aid was employed as an Airway Beacon.
Reference: Duke 1927

FLICKERING BEACON. An experimental approach landing system. One of several versions tested at Indianapolis in the 1940s. Four such Beacons were placed on a hanger and emitted 120 fpm messages at 50 million cp.
Reference: CAA Tests AC 1945

INCANDESCENT BEACON. A descriptive term rather than an official one. It refers to early Beacons at emergency fields.
References: Leary 1985, Night Mail 1953

LANDMARK BEACON. This is possibly a type of Airway Beacon. It aided the navigator in determining position.
Reference: PICA0 1944

SOLAR POWERED BEACON. This is a reference to REILS (Runway End Identifier Light) powered by solar energy. Beacon rather than Light is included in the title.
Reference: Potts IJ 1994

b) Support Structures

General Note. Most references in the literature are to light apparatus and few are to the supporting structures. However some sources provide mention of towers for Beacons. The following entries suggest the kinds of supports in use.

51' AIRPORT BEACON TOWER.

Reference: National Airport Equipment

BEACON TOWER. FAA includes several forms:

PREFAB TOWER STRUCTURE

STRUCTURAL STEEL TOWER

TUBULAR STEEL TOWER

DOUBLE WOOD POLE TOWER

Reference: Airp Misc Vis Aids 1971, GE (1st term)

TUBULAR TOWER/TUBULAR BEACON TOWER/TUBULAR STEEL
AIRPORT BEACON TOWER

Reference: Airport 51-Ft Tubular Bn Twr

AIRPORT BEACON TOWER

Reference: Meyer Machine

TOWER, AERIAL NAVIGATION BEACON.

Reference: CAA 1948

1C5 Obstruction Lighting

General Note I. This segment of Nav aids is intended to be a cohesive, integrated coverage. Admittedly, Obstruction Lighting includes a diversity of terms. Historically such lighting was red in color and closely adhered to the meaning of red for danger or warning. Obstruction Aids that rotated or flashed were termed Beacons while smaller, simpler units were labelled Lights. More recently the line has blurred as newer forms of lights have been introduced. Red is no longer exclusively the color in use. Greater use of white or blue-white strobe lights have been employed.

General Note II. The term Light or Lighting is only infrequently employed in this category. Beacons or lights accompanied by a more specific term (e.g., hazard, obstruction) are more common. However, Obstruction Lighting remains in use and is the overarching term for this category. And Obstruction is the most commonly employed qualifying word. Hazard and obstacle are also used though

less frequently. A final term, 300 mm Beacon is often found in Obstruction Lighting. Fresnel Beacons for Code, Identification and Hazard Beacons all employ 300 mm Beacons which continue in use.

General Note III. Beacon and Light terms provide differentiation for this form of Navaid to a degree. However, it breaks down to an increasing degree. Light is employed to a greater degree though Beacon remains in use. Strobe apparatus are often referred to as Lights and are more powerful than Beacons; at times they are replacements for that term. Beacons are a major category though few forms use the single, core term.

a) Overarching Terms

AIRPORT HAZARD BEACON. Few details are given in the source. It seemingly refers to Hazard Beacons at Airports though of somewhat limited use.

Reference: St Specs. 1959

HAZARD BEACON. This can be an overarching term though for some sources it refers to the specific terms of Code Beacon, 300 mm Beacon which see.

References: NATO 1992, Toshiba

HAZARD LIGHT. Seemingly a synonym for Obstruction Lighting. Hazard Beacon can have a more specific meaning.

Reference: Finch 1961

HAZARD WARNING BEACON. This is seemingly an overarching term though Cayless specifically refers to a High Intensity White Neon Lamp.

Reference: Cayless 1983

OBSTRUCTION LIGHTING.

Classification #: 324

Form of Device: Lighted Aero Aid

Operation: Obstruction Lights often flash though simple models are of a fixed character. Traditional red forms now joined by strobe light with variant versions of white hues.

Comments: This is the basic term for this form of Navaid and is an encompassing term for the field. Obstruction Aids are sometimes termed Lights and sometimes termed Beacons. They can be encompassed by Obstruction Lighting which is the basic term in classification though a case can be made for Obstruction Lights.
References: OML 1991, IES 1972

OBSTRUCTION IDENTIFICATION. Overarching term for Obstruction Marking and Lighting. The term in itself may not be an Aid though it encompasses Aids.
Reference: IES 1981

OBSTRUCTION LIGHTS. A term of elastic meaning. It can be an overarching term yet not infrequently it denotes simple steady-burning lights of red hue that represent the basic level of Obstruction Lighting. The term can be used in a general and imprecise manner while at other times it can have a precise meaning that means simple Lights.
References: IES 1972, A & W 1972, Sharp 1944, CAA 1941, CD 1978, D & B 1977

OBSTRUCTION MARKER LIGHTING. A subsystem of Emergency Airport Lighting System (EALS). This is the equivalent of Obstruction Lighting.
Reference: EALS 1999

OBSTACLE LIGHT. This is the primary term for ICAO. This term encompasses Low-Intensity (LI) Obstacle Light, Medium-Intensity (MI) Obstacle Light, High Intensity (HI) Obstacle Lights. L-I are fixed (steady-burning) red lights; M-I are red flashing; H-I are flashing white (some M-I may be white when associated with H-I).
References: AD 1990, Lexicon 1986, Air Corps News Letter 1936

OBSTRUCTION MARKING & LIGHTING. An overarching term that encompasses all visual forms. It also serves as a publication title.
References: Ben. & Lux., OML (publication title)

TOWER & OBSTRUCTION LIGHTING/TOWER OBSTRUCTION LIGHTING. AN H & P publication title which can serve as a possible

overarching term. H & P distinguishes between actual Obstructions and Towers though towers can be hazards to navigation as well as other structures. Other makers have similar terms. The second term is not an overarching term though also from H & P and included here.

References: H & P 1994, Nat. Airport Equipment

RED DANGER LIGHT. A historic term that can be an overarching term. The term incorporates the color and the traditional meaning of red.

Reference: Duke 1927

b) Beacons

ANTICOLLISION BEACON. A descriptive or possibly company term for the High Intensity Strobe Obstruction Light.

Reference: ILC

BEACON, 300mm HAZARD/300mm BEACON (OBSTRUCTION)/300mm HAZARD BEACON/300-mm HAZARD BEACON/300mm BEACON/300mm HAZARD BEACON (RED). All of these are forms of Code Beacon. They employ Fresnel lenses, are of a flashing character and display red messages.

References: Ap L Eq 1976, OML 1973, CAN DOT, Westinghouse, H & P

There are other terms closely allied to the above terms:

RED BEACON (OBSTRUCTION). This is a 300 mm Beacon. It presents a shorter form of basic name but within the obstruction category.

Reference: OML 1991

FLASHING BEACON. Shorter form of Flashing Omnidirectional Beacon which is a 300 mm Code Beacon in hazard mode.

Reference: FAA OML 1991

FLASHING HAZARD BEACON/FLASHING RED HAZARD BEACON. Aid has design of the traditional 300mm Beacon.

Reference: C-H 1979

FLASHING OMNIDIRECTIONAL BEACON. A component of Red Obstruction Lighting System. It is designated L-864.
Reference: OML 1991

LIGHT, NAVIGATIONAL, BEACON, OBSTACLE OR CODE. See next entry.
Reference: Mil Spec 1983

OBSTACLE BEACON. A term from US Military Specs. According to C-H it is the equivalent of Light, Obstruction, Medium Intensity (FAA). See also: Obstacle Light.
References: C-H 1991 (Reprint of US Mil Specs)

OBSTRUCTION STROBE BEACON.
See Also: Obstruction Strobe Light.
Reference: H & P 1994

ROTATING BEACONS. CAA's OML for 1953 included three Beacons for Obstruction Lighting. The Beacons were also employed for other purposes. The Beacons included: Beacon, 36-inch, Rotating, Double End Type; Beacons, 24-inch, Rotating Drum Type; Lamp Assembly-24-inch Rigid Drum Type Rotating Beacon.
Reference: CAA 1953

ROTATING 24-INCH BEACONS. IES includes this Beacon in its Obstruction Lighting mode. It has been employed for airport and airways uses as well.
Reference: IES 1972

300-MILIMETER FRESNEL LENSED, OBSTACLE OR CODE BEACON NAVIGATION LIGHT. This is, obviously, a government and military term. The title offers a comprehensive descriptive of physical apparatus and morphological dimension includes Obstruction Marking.
Reference: Mil Spec 1983

300 mm CODE BEACON/FLASHING CODE BEACON/300 mm CODE &

HAZARD BEACON. The first two terms refer to Obstruction Marking in this context. The third term is a category of lights for Westinghouse that includes the core Code Beacon, and a variant form employed for Hazard Beacons.
References: H & P 1994 (L), CAA 1953 (C), Westinghouse (R).

c) Obstruction Lights-Incandescent & Miscellaneous Forms

AVIATION RED OBSTRUCTION LIGHT. Term is either a formal name that includes color in title, or a more descriptive appellation that may not be an actual title.
Reference: IES 1981

DOUBLE & SINGLE OBSTRUCTION LIGHTS. A sub-overarching term that brings together both forms of Steady-Burning Obstruction Lights.
Reference: CAA 1953

DOUBLE OBSTRUCTION LIGHT. This term usually refers to a simple Light that is steady-burning with cover/lens. Obstruction Light by itself can suggest a broader range of Light forms.
Reference: H & P 1994

FIELD OBSTRUCTION LIGHT. Obstruction Lights at early airfields. Seemingly its role was to denote location. A descriptive term rather than a formal one.
Reference: Whitnah 1966

LOW INTENSITY OBSTRUCTION LIGHT. Possibly a descriptive title more than one that is an official, formal title. It conforms to the steady burning basic level light.
Reference: IES 1972

NEON OBSTRUCTION LIGHTING. This a steady burning and low intensity Aid. It qualifies as Red Light for ICAO. There are both single and double forms.
Reference: H & P 1994

OBSTRUCTION MARKER LIGHT. This is probably the equivalent of

Obstruction Light. But only limited details are available.
Reference: Momberger AF 1986 (From AMA Private, LTD)

RED OBSTRUCTION LIGHTING. A sub-overarching term. It includes Flashing Omnidirectional Beacons, and Steady Burning Lights (Single Obstruction, Double Obstruction Light).
Reference: OML 1973

SINGLE OBSTRUCTION LIGHT. This usually refers to a single unit, basic Obstruction Light. See Also: Double Obstruction Light.
Reference: OML 1978

STEADY-BURNING LIGHTS/STEADY BURNING RED OBSTRUCTION LIGHT. Term refers to basic level of simple Obstruction Lights.
Reference: OML 1978

SUSPENSION TYPE OBSTRUCTION LIGHTS. A type of Light that can be raised, lowered by cables.
Reference: CAA 1953

d) Obstruction Lighting-Strobe & Composite Forms

CATENARY LIGHTING. Consists of Lighted Marker for marking high-voltage catenary wires (day and night). Possibly applied to support structures as well.
Reference: AIM 1999

DAYTIME LIGHTING FOR TALL OBSTRUCTIONS. IES employs this term for High Intensity Strobe Lights under development in the early 1970s.
Reference: IES 1972

DUAL LIGHTING/DUAL LIGHTING SYSTEM. Two systems of Lights are included: one for night use (traditional incandescent red), and one for day use (strobe, white).
Reference: OML 1978, 1991

DUAL LIGHTING WITH RED--MEDIUM INTENSITY FLASHING SYSTEM/
DUAL LIGHTING WITH RED--MEDIUM INTENSITY FLASHING WHITE/
DUAL, RED-WHITE MEDIUM INTENSITY OBSTRUCTION STROBE
BEACON. Two colors of red and white are in one unit. HI day is 120,000 cp. MI
is 20,000 cp.

Reference: OML 1991, H & P 1994 (3rd term)

HIGH INTENSITY FLASHING WHITE LIGHTS. These are for tall structures
and presumably strobe in nature. Probably equivalent of following entry.

References: AIP 1999, AIM 1999

HIGH INTENSITY FLASHING WHITE OBSTRUCTION LIGHT. Term refers
to Strobe Lighting System that can be used during the daylight hours. There are
reduced intensities for twilight, night operations.

Reference: OML 1991

HIGH INTENSITY OBSTRUCTION LIGHTING SYSTEM.. The meaning is
probably little different from that of terms lacking "system" though inclusion of
that word makes the system character more explicit.

Reference: H & P 1994

HIGH INTENSITY WHITE OBSTRUCTION LIGHT. Presumed equivalent of
previous and next entries.

Reference: AIM 1999

LOW-POWER CONSUMPTION STROBE-TYPE/STROBE-TYPE FLASHING
RED OBSTRUCTION LIGHT. This Aid employs an xenon flashcube and
employed where commercial a.c. power not available.

Reference: H & P 1994

MEDIUM INTENSITY FLASHING WHITE OBSTRUCTION LIGHT. Term
refers to a form that supplies daylight and twilight obstruction lighting.

Reference: OML 1991

MEDIUM INTENSITY FLASHING WHITE OBSTRUCTION LIGHTS, 40

FPM/MEDIUM INTENSITY FLASHING WHITE OBSTRUCTION LIGHT, 60 FPM. Newer FAA standards includes flash rate as part of the title.
Reference: Specs for Obstr Light 1988, 1995

MEDIUM INTENSITY OBSTRUCTION STROBE BEACON/MEDIUM INTENSITY OBSTRUCTION STROBE. This form of MI Obstruction Light employs strobe lighting technology. White only in color with 20000 cp for day use and 2000 cp at night.
Reference: H & P 1994

MEDIUM INTENSITY OMNIDIRECTIONAL FLASHING WHITE LIGHT SYSTEM.. Lights, day and night, for catenary support structures.
Reference: AIM 1999, AIP 1999

MEDIUM INTENSITY STROBE. Short form of full title. See Medium Intensity Obstruction Strobe Beacon.
Reference: H & P 1994

OBSTACLE LIGHTS. ICAO divides this form into three basic groups:

LOW-INTENSITY LIGHT. These are employed on fixed objects, Types A and B display fixed-red lights.

MEDIUM-INTENSITY, TYPE A. This form is white, flashing, 60-90 fpm.

MEDIUM-INTENSITY, TYPE B. White, flashing, 20-60 fpm.

MEDIUM-INTENSITY, TYPE B. Red, flashing, 20-60 fpm.

HIGH-INTENSITY OBSTRUCTION LIGHTS. There are two Types: A and B. Both display white, flashing messages. A is 200000 cp; B is 100000 cp.
Reference: AD 1999

OBSTRUCTION STROBE LIGHT/OBSTRUCTION WARNING LIGHT. Physical apparatus employed in High Intensity Obstruction Light System. Second term is actual company name of product.
Reference: H & P 1994

1D Approach Lighting

1D1 Overarching Terms

a) Major Terms

APPROACH LIGHTING SYSTEM. An arrangement of lights extending from the beginning of the runway and outward toward the start of the aircraft approach area. The patterns are now nearly all centerline forms. Lights can be white and or colored. Some flashing lights may accompany the steady burning lights.
References: NATO 1992, Multi-Electric, IES 1987, McKelvey IN 1987, AD Vol II 1995

APPROACH LIGHTS.

Classification #331.

Form of Device: All-lighted Aero devices.

Operation: Configuration of fixed and flashing units at approaches to runway.

Comment: This term can suggest the physical and individual unit of lamp, lamp holder, housing, support. But frequently it seems to suggest a system of Approach Lights configured into an approach pattern. The term may differ little in meaning from Approach Lighting System. More than 20 surveyed sources employ the term ending in system, and nearly as many this shorter term. Basic term in classification.

References: Godfrey, Wood 1940, Taneja 1987, Glidden 1946, D & B 1977

APPROACH LIGHTING. This term is more clearly a system term. Though it is employed less frequently than Approach Lights. Users included historic and contemporary sources, governmental agencies, and manufacturers.

References: NavFacEngCom 1981, New Hope AW 1951, STOL Port 1970, Warskow 1950

b) Secondary Terms

AIRPORT APPROACH LIGHTING. This term suggests a primary term. Yet few sources employ it. Most major terms omit Airport. Possibly because the context of

the terms is that of airports and hence airport is implicit.
References: Pilots ... AW 1952, Doty AW 1957, Wilson 1979

AIRPORT APPROACH LIGHTING SYSTEM. This term may appear to be the archetype for this category. Yet few sources use it.
References: CAA Tests ... 1945

APPROACH LIGHT SYSTEM. A largely historic term that would seem to be an ideal term for Approach Lights in a systematic pattern.
Reference: New Hope AW 1951, Horonjeff 1962, Christian AW 1966, Slope Line AW 1948, D & B 1977

APPROACH-LIGHT. An infrequently employed variant term.
Reference: CAA Pushes ... AW 1950

APPROACH AIDS. For Cegelec this refers to Helicopter Glide Path Indicator and other Tri-Color Indicators. For MLS it refers to PAPI and PLASI. The term gives the appearance of a general term.
References: Cegelec, MLS: Setting AI 1984

APPROACH SYSTEM. Presumably a short form for Approach Light System.
Reference: AD 1969, Supplement 1971

CIVIL VISUAL APPROACH AIDS. For Cegelec this refers to a broad range of Nav aids for Heliports including Radio Aids.
References: Cegelec, PAPI AI 1984

c) Sub-Overarching Terms

DESCENT AID. An informal overarching term for a range of similar Aids.
Reference: Young 1994

FINAL APPROACH & TAKE-OFF AREA (FATO). This refers to helicopter landing operations.
Reference: Thom-EMI

FLASHING OR PULSED AIDS. A somewhat informal term employed in Part J.
Reference: Part J 2002

GROUND LIGHTS FOR LANDING GUIDANCE. A general term for Landing Aids that are lighted.
Reference: Cayless 1983

LANDING AIDS. A near-overarching term for a variety of Aids that refer to landing operations.
Reference: Cayless 1983

VISUAL LANDING AIDS. A similar term though more specific in meaning.
Reference: Cayless 1983

AIRFIELD APPROACH SYSTEMS. Term refers to Radio Aid rather than Visual Aids. Overarching term for various systems including ILS, SBA.
Reference: Kendal JN 1990

ALIGNMENT-TYPE CARRIER LANDING SYSTEM. Term refers to systems employed on aircraft carriers including FLOLS and MDLA.
Reference: Clark 1981

APPROACH VISUAL GUIDANCE SYSTEM. Overarching term for PAN, HAPI and Discharge Capacitor Lights (REIL, Runway Lead-in Lighting System, etc).
Reference: Thorn

LIGHTING SYSTEMS. Term presents an overarching appearance. However, it specifically refers to Approach Lighting.
Reference: Christian AW 1956

NEW GENERATION RUNWAY VISUAL RANGE SYSTEM. This is not an A/n as such. It gives information on RVR. It includes various sensors and monitors.
Reference: FAA FTP 2000

NIGHT LANDING SYSTEM. Overarching term for a variety of systems.
Reference: Young 1994

STANDARD APPROACH AID. A Radio Aid term that refers to MLS.
Reference: Butterworth-Hayes AI 1986

VISUAL AID TO APPROACH FOR LANDING. Term describes Approach Lighting. Uncertain if it is an actual term.
Reference: CAA 1958

VISUAL APPROACH AIDS. Overarching term for Approach Lighting and other Aids including VASI.
Reference: Clark 1981

1D2 Equipment Terms

a) Physical Terms

General Note. These terms from Part G all refer to lamps with various qualifiers attached.

HIGH INTENSITY UNIDIRECTIONAL LAMP
MEDIUM INTENSITY OMNIDIRECTIONAL ELEVATED LAMP
LOW INTENSITY OMNIDIRECTIONAL ELEVATED LAMP
OMNIDIRECTIONAL FLASHING LAMP
UNIDIRECTIONAL FLASHING LAMP

Further Terms:

CAPACITOR DISCHARGE LIGHT. Reference: AD 1999, Lexicon 1985
CONDENSER DISCHARGE LIGHT. Reference: Warskow 1950

b) Physical/Morphological Terms

General Note. These terms contain both mention of physical apparatus and morphological function in the title. Since the physical is considered in the

previous segments these terms are not given extensive descriptions.

ALS THRESHOLD LIGHT BAR. Reference: FAA ADS-Site 1973

APPROACH DIRECTION LIGHT. Reference: NATO 1992, NavFacEngCom
1946

APPROACH FLASHERS. Reference: Flash Technology

APPROACH HIGH INTENSITY UNIDIRECTIONAL LIGHT. Reference: ADB.

APPROACH INSET. Reference: Flash Technology

APPROACH LIGHT. Note: This term in plural form can also have the meaning
of a system of Approach Lights. Reference: Godfrey

APPROACH LIGHT BAR ASSEMBLY. Reference: Spec. for L-848 1965

APPROACH LIGHTS FOR OTHER INSTRUMENT RUNWAYS. Reference:
IES 1987

APPROACH MEDIUM INTENSITY OMNIDIRECTIONAL ELEVATED
LIGHT. Reference: ADB

APPROACH SEQUENCE FLASHING UNI-DIRECTIONAL DIRECT LINE
COUPLE FLASHING LIGHT. Reference: Idman

APPROACH SIDE ROW LIGHT. Reference: ADM 1983

APPROACH, THRESHOLD. Reference: Flash Technology

BARRETTE/CENTRE LINE BARRETTE. Reference: AD 1999

BARTOW D-1 LIGHTS. Reference: Douglas 1978

ELECTRONIC-FLASHING-APPROACH LIGHTING. Reference: GTE Sylvania

ELEVATED APPROACH LIGHTS. Reference: Pollock AI 1990, C-H,
Mombberger AF 1986

FLASHERS/FLASHING LIGHTS. Reference: Douglas 1978

FLASHING APPROACH LIGHT. Reference: Stone AW 1957

FLASHING LIGHTS. Reference: FAA FTP 2000. [Component of REIL].

FLUSH APPROACH LIGHT. Reference: USAF AW 1957

GROUND LEVEL APPROACH SEARCHLIGHT, HIGH INTENSITY.
Reference: Toshiba, Ulmer

HELIPAD APPROACH LIGHT. Reference: IES 1981

HIGH INTENSITY APPROACH LIGHTS. Reference: Pilots ... AW 1952

HIGH INTENSITY & DISPLACED THRESHOLD LIGHT. Reference: Sepco

HIGH INTENSITY DOUBLE-SKINNED UNIDIRECTIONAL ELEVATED
APPROACH LIGHT. Reference: Cegelec

HIGH INTENSITY UNI-DIRECTIONAL INSET APPROACH LIGHT.

Reference: Cegelec

LAMP HOUSING ASSEMBLIES. Reference: FAA FTP 2000. [Component of PAPI with Remote Monitoring Sensor].

LIGHT MARKER AIRPORT APPROACH. Reference: Godfrey
LIGHTS, FLASHING, OMNI-DIRECTIONAL: ODALS, REILS. Reference:

Ap L Eq 1976, 1981

PAR 56 APPROACH LIGHT. Reference: Godfrey

Q20A/PAR 56 APPROACH LIGHTS/PAR 56 APPROACH LIGHT LAMP.

Reference: Douglas 1979

SEMI-FLUSH APPROACH LIGHT. Reference: Douglas 1978

SEQUENCE FLASHERS/FLASHERS. Reference: Douglas 1978

SEQUENCE FLASHING LIGHTS ON CENTER LINE APPROACH.

Reference: NATO 1992

SEQUENCE FLASHING LIGHTS. Reference: Breckenridge 1955, Finch 1961

SEQUENCE FLASHING LIGHTS-UNITS. Reference: Spec for L-849 1965

SFL. This is acronym for Sequenced Flashing Lights. Reference: Douglas 1979

SIDE ROW BARRETTE. Reference: Douglas 1978

STEADY BURNING LIGHTS. Reference: Douglas 1978

c) Support Structures

General Note. Most references to Approach Lighting functions and apparatus omit mention of the necessary support structures. These structures can be substantial and of considerable height. A few sources include these structures and are here listed. Necessary notes included when required.

LOW-IMPACT RESISTANT STRUCTURES. Reference: Jacquith

LIR. An acronym for previous term. Reference: Jacquith

FRANGIBLE SAFETY MAST FOR APPROACH SYSTEM. Frangible refers to the ability of a structure to break off easily when struck. Such structures are sturdy though frangible.

Reference: Danaid

FRANGIBLE SAFETY APPROACH MAST. Reference: Jacquith

SAFETY MAST FOR APPROACH LIGHTS. Reference: Idman

SAFETY MAST FOR APPROACH SYSTEM. Reference: Danaid

1D3 Approach Lighting Systems

General Note. Part H Classification divided systems into two segments: ICAO & NATO, and US-FAA. That approach may have been somewhat simplistic yet it provided a reasonably well-functioning instrument for handling the welter of terms. This coverage instead divides Approach Lighting into Approach Lighting Systems, Special Approach Light Forms, and Historic Terms. Some terms in a) are identical (or overlap) with overarching terms. Those terms fit as well or nearly so with both overarching and system themes.

a) Approach Lighting Systems

APPROACH LIGHT/APPROACH-LIGHT. Are these system terms despite an appearance of individual units? Both terms appear in a near-historic source. For Douglas the second term refers to type of Lights.
References: Breckenridge 1955, Douglas 1978

APPROACH-LIGHT SYSTEM. Term refers to early system for Approach Lighting employing a neon "ladder" (ca. 1940).
Reference: Douglas 1978

APPROACH LIGHTING SYSTEM. This apparently core term is employed by few sources. It can encompass all forms of approach systems.
Reference: ADM 1993

APPROACH LIGHT SYSTEM (ALS). Term refers to the essential system for aircraft transition from enroute operations to landing process. Includes acronym.
Reference: AIM 1999

ALSF-1/ALSF-I. Abbreviated term for High Intensity Approach Lighting System for Category II and III ILS operations. It includes two cross bars, extensive series of flanking wing bars with red lamps.

References: Ap L Sys Config 1977, Facility Ops 1991, VGLS 1969, 1974

ALSF-2/ALSF-II. Abbreviated term for High Intensity Approach Lighting System for Category I ILS operations. It includes one crossbar, sequenced flashers, two wing bars with red lamps.

References: AIP 1991 (1st), A & W 1979

ALSF-2 SYSTEM/ALSF-2 APPROACH-LIGHT SYSTEM. Variant form that includes the word System thereby clarifying the system character of ALSF-2.

Reference: IES 1981 (1st), Douglas 1978 (2nd)

ALPHA SYSTEM. Alternative term for ALS employed by IES.

Reference: IES 1987

ALSF-II-SSALR DUAL MODE HIGH INTENSITY APPROACH LIGHT SYSTEM/ALSF-II-SSALR DUAL MODE SYSTEM/DUAL MODE HIGH INTENSITY APPROACH LIGHTING SYSTEM. These terms refer to two modes within one system. It is a complete high intensity system with full white lamp configuration, red wing bars, and two cross-bars. In reduced level of operation it is a more limited system. SSALR is regarded as a "building block" for more complex operations.

References: Godfrey, Airflow 1985

ALS/SFL CAT I & CAT II. A naval acronym for Approach Light System for Cat II and III operations.

Reference: NavFacEngCom 1946

APPROACH LIGHT SYSTEM FOR CAT II & III RUNWAYS. This term is the equivalent of ALSF-2.

References: IES 1981, 1987

APPROACH LIGHT SYSTEM FOR CAT I OPERATIONS. An IES term that

includes three forms of Approach Lighting: Modified Calvert, Alpha, Medium Intensity Category I System.
Reference: IES 1987

APPROACH STROBES. Part of EALS. Seemingly comparable to standard strobes used in REI, ODALS, etc. See also Strobes.
References: EALS 1999

CAT I ALS/CAT II ALS. Acronyms for High Intensity Systems for Category I and Category II operations.
Reference: IES 1972

CAT 2 APPROACH LIGHTS. Term appears in a context of color study.
Reference: McKelvey IN 1987

CIRCLING APPROACH LIGHTS. Refers to research and developments including reworked lighting needed for circling approach by aircraft when landing. They bear similarity to older Boundary Light role.
Reference: Finch 1961

FAA HIGH INTENSITY. Descriptive term for some forms of Approach Lighting.
Reference: A & W 1979

HIGH INTENSITY APPROACH LIGHT SYSTEM/HIGH-INTENSITY APPROACH-LIGHT SYSTEM/HIGH-INTENSITY APPROACH LIGHTS. These terms can refer to intensity level of systems for ALS Cat I & II. However, some sources are historic and refer to systems in earlier stages of development.
References: Instruc Det for Rnwy Ctr; TDZ 1975, ADS-Site 1973, CAA Withdraws AW 1950

HIGH INTENSITY APPROACH LIGHT SYSTEM WITH SF. An IES term for ALSF-2.
Reference: IES 1987

HIGH-INTENSITY APPROACH LIGHTING. (HIAL in Australia, Calvert, or

RAE).

Reference: McKelvey JN 1987

HIGH INTENSITY LIGHTS. Term includes Approach Lights but may go beyond that category.

Reference: NavAero 1946

MALS. Acronym for US Medium Intensity Approach Light System.

Reference: Douglas 1979

MALS, MEDIUM INTENSITY APPROACH LIGHT SYSTEM.. Acronyms are plentiful in US practice. This term refers to Medium Intensity system for non-precision approaches. FAA describes it as an "economy type system."

References: VGLS 1969, 1974, ALNACO, SEPCO

Other Medium Intensity systems can be seen as offshoots of the core system. Those systems are listed here with selected remarks only:

APPROACH LIGHT SYSTEM, M.I., MALS

Reference: Econ Ap L Aids 1970

MALS STEADY BURNING LIGHTS.

Reference: SEPCO 1971

MALSF. Acronym for Medium Approach Lighting with Sequence Flashers. SF added when identification difficulties exist in approach areas.

References: VGLS 1969, GTE Sylvania, C-H 1979, ADS-Site 1969, 1971

MAL/SF. Altered formulation of Medium Approach Lighting with Sequenced Flashers.

Reference: NOTAMS 1987

MALSR. Acronym for Medium Approach Lighting System with Runway Alignment Lights. This system is an economy form of precision approach system.

Reference: VGLS 1974, Douglas 1979

MALSR SYSTEM. A variant of basic term emphasising the system's character.
Reference: Douglas 1978

MALSR APPROACH-LIGHT SYSTEM. Combines acronym and word form though two symbol entities are not fully compatible.
Reference: Douglas 1978

MEDIUM INTENSITY APPROACH LIGHTING EQUIPMENT.
Reference: FAA Approved Lighting 1968, 1973

MEDIUM INTENSITY APPROACH LIGHTING BAR ASSEMBLY.
Reference: Ap L Eq 1973, NOTAMS 1987, Spec for L-848, 1965, Vis Ap L Ind Sys 1976

MEDIUM INTENSITY APPROACH LIGHTING.
Reference: SEPCO 1971

MEDIUM INTENSITY LIGHTING SYSTEM.
Reference: SEPCO 1971

MEDIUM INTENSITY (MALSR, MALSF, MALS). Medium Intensity includes several systems.
Reference: A & W 1979

NON-INSTRUMENT APPROACH SYSTEM. A "Centerline cross- bar system" with single row of steady-burning lights in aviation yellow or aviation red.
Reference: IES 1987

NON-PRECISION APPROACH LIGHTING SYSTEM. For IES this category included MALS and MALSF.
Reference: IES 1972

PRECISION AIRPORT CATEGORY I LIGHTING SYSTEM. An alternate form of basic term.

Reference: AD 1999

PRECISION APPROACH CATEGORY I LIGHT SYSTEM. A system consisting of a row of Lights, and one crossbar. It displays variable white color. The system incorporates capacitor discharge lights.

Reference: AD 1999

PRECISION APPROACH CAT II & III LIGHTING SYSTEM. Term consists of 900m length centerline of lights and two side rows and two crossbars.

Reference: AD 1999

SALS. Acronym for Short ALS.

Reference: IFH 1971, NOTAMS 1987

SIMPLE APPROACH LIGHTING SYSTEM. Basic system for ICAO. It has a row of lights with one crossbar. Lamps can be singles or barrettes. Lights are fixed (steady-burning). Color is not specified; however, it is not to be confused with other aviation lights.

Reference: AD 1971, 1999

SIMPLE SYSTEM. One of two approach forms for early ICAO; this is Type A.

Reference: AD 1951.

SIMPLIFIED APPROACH LIGHTING/SIMPLIFIED APPROACH LIGHTING SYSTEM. Presumably conforms to ICAO. One row of fixed (steady-burning); flashing lights can be added.

Reference: Ben & Lux MP

“SIMPLIFIED” APPROACH LIGHT SYSTEM. Term includes SSALS, SALSF, SALSr.

Reference: Douglas 1979

SSALF. Acronym for Simplified Short Approach with Sequenced Flashers.

Reference: CD 1979, Econ Ap 1970

SSALR. Acronym for Simplified Short Approach Lighting System with Runway Alignment Indicator Lights (RAILS).
Reference: CD 1979, Econ Ap 1970

SSALS. Acronym for Simplified Short Approach Lighting System. It is employed for non-precision approaches.
References: VGLS 1974, Econ Ap 1970

STANDARD HIGH INTENSITY APPROACH LIGHTING SYSTEM.
Descriptive phrase more than formal name.
Reference: Warskow 1950

STRAIGHT-IN APPROACH SYSTEM. System including Non-Visual Aids allowing for straight approach rather than circling approach.
Reference: ADB

SYSTEM OF APPROACH-LIGHTS. Descriptive term more than a formal term.
Reference: Douglas 1978

b) Special Approach Lighting Forms

AIRPORT LEAD-IN LIGHTING SYSTEM (LDIN). Flashing Lights that denote route to runway final approach.
Reference: AIP 1991

CIRCLING GUIDANCE LIGHTS. Term is seemingly akin to ODALS. It is an ICAO term while ODALS is of US provenance.
Reference: ADM 1993, AD 1999

LEAD-IN LIGHTS. Listed without description. Possibly Landing Direction Lights conform to the term: five yellow lights delineating approach path.
Reference: HD 1994

LEAD-IN LIGHT SYSTEM (LDIN)/AIRPORT LEAD-IN LIGHT SYSTEM/
RUNWAY LEAD-IN LIGHTING SYSTEM. A group of Flashing Lights that

indicates course to airport runway and final approach. LDIN employed where terrain or other factors make approach to airport a particular problem. Second and third terms are variants of the core term.
Reference: ADS-Site 1980, Econ Ap L 1970, AIP 1991 (2nd), ADM 1993 (3rd)

LEAD-IN LIGHTING. FAP notes this form all but eliminated due to Approach Lighting. A pre-1960 era Aid.
Reference: CAA 1958 Fed Arwy Plan

LONG LEAD-IN STROBE LIGHTING (LLDIN). Omnidirectional Strobe Lights. Provides guidance to specific runways.
Reference: "Short Takes" AI 1994

ODALS. Acronym for Omnidirectional Approach Lighting System.
Reference: Ameriel, AD Vol II 1995

OMNIDIRECTIONAL APPROACH LIGHT SYSTEM (ODALS). This system is made up of seven Omnidirectional Flashing Lights. Color of message is white. Five of the seven Lights are in a row while the remaining two flank the corners of the runway threshold.
Reference: IES 1987, ADS-Site 1980

OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM (ODALS). A slight variant of previous term. It ends in Lighting instead of Light.
Reference: IES 1987

OMNIDIRECTIONAL FLASHING LIGHTS. This is more a reference to physical apparatus than to function. Context of the Lights is ODALS which see.
Reference: AIP 1999

OMNIDIRECTIONAL LEAD-IN APPROACH LIGHT SYSTEM. Term listed only. Corresponds to AIP 1991
Reference: Econ Ap Lighting Aids 1970

OMNI-DIRECTIONAL LEAD-IN LIGHTS. Descriptive term. Formal name is

Approach Lights. A row of lights for helicopter operations displayed in low visibility.

Reference: Cegelec AGLE

OMNIDIRECTIONAL LIGHTS. Term has specific reference to Circling Guidance Lights.

Reference: ADM 1993

RAILS/RUNWAY ALIGNMENT INDICATOR LIGHTS/RUNWAY ALIGNMENT INDICATOR LIGHT SYSTEM.. These are seven sequenced flashing lights 200 feet apart below the threshold of the runway. Terminology varies from acronym only to acronym and full name to full name only.

Reference: IES 1966

REIL. Acronym for Runway End Identifier Light which see.

References: AIP 1999, A & H 1979

RIL, RUNWAY IDENTIFICATION LIGHTS. These Lights are also termed REIL or Runway End Identification Lights. They are two lights near the runway threshold which identifies the threshold.

References: IES 1981, C-H 1991, FAA ADS-Site 1980, NATO 1992

RUNWAY END IDENTIFIER LIGHT (REIL)/RUNWAY-END IDENTIFIER LIGHT. This Aid provides identification of a runway through two flashing Lights, omnidirectional or unidirectional. It is needed for identification of runway unclear because of other lights, terrain, low visibility. The second term is a variant form.

Reference: AIP 1991 (1st), FAA FTP 2000 (2nd)

STROBES. A somewhat vague term. Perhaps a "shorthand term" for Lights employed in REIL. ODALS and other systems. See also: Approach Strokes.

Reference: EALS 1999

VISUAL VECTOR OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM.

Term joined by maker's model name.

Reference: Unitron

c) Historic Terms

1) Slopeline Systems

DOUBLE-ROW FUNNEL-SHAPED SLOPE LINE CONFIGURATION/DUAL-ROW FUNNEL-SHAPED SLOPE LINE CONFIGURATION. Both terms are more of a descriptive title than a formal name for Slopeline Systems.

Reference: C-L Test AW 1950

PEARSON SLOPE LINE APPROACH LIGHT SYSTEM. The name of the inventor of Slope Line (or one form) is attached to the basic term.

Reference: Haber 1958

H.I. SLOPE LINE APPROACH LIGHTS. Seemingly all Approach Lights of that time were high intensity.

Reference: IES 1952

SLOPELINE SYSTEM. A welter of terms and variant forms accompanies this Navaid. Slopeline System can serve as a basic term. This system was promoted by the US CAA in the late 1940s/early 1950s. It never met with widespread approval and was eventually dropped. The system created an arrangement of lights resembling a funnel. The outer most lights were well apart while those near the runways were close together. When on target the pilot saw two narrowing rows of solid lights. If off-course then the lights appeared as segmented slats of light either to the left or to the right.

References: Moore AW 1950, Clark 1981, Wilson 1979, Warskow 1950

SLOPE LINE LIGHTING SYSTEM. A single and historic source employed this variant form. Admittedly historic is employed rather casually.

Reference: CAA Withdraws AW 1950

SLOPE LINE APPROACH-LIGHT SYSTEM/SLOPE-LINE APPROACH-LIGHT SYSTEM/SLOPE LINE APPROACH LINE SYSTEM. Variant forms of the basic term.

References: FR Arcata 1949, CD 1979 (2nd), Warskow 1950 (3rd)

SLOPELINE APPROACH LIGHT SYSTEM. Another slightly nuanced variant form of the basic term.

Reference: More on Slopeline AW 1955, CD 1955

SLOPE-LINE SYSTEMS. Similar to base term. Only two surveyed references employ it. One, *Newsweek*, offers a succinct and helpful description of Slopeline which influenced the entry under Slopeline Systems.

References: Kroger AW 1948, Lights For ... *Newsweek* 1958

SLOPE LINE SYSTEM. This term is akin to basic term of Slopeline System and previous hyphenated version.

Reference: Light Squabble AW 1949, Slopeline AW 1948

SLOPELINE-TRANSVERSE BAR APPROACH-LIGHT SYSTEM/SLOPE - LINE APPROACH-LIGHT SYSTEM WITH TRANSVERSE BARS (SET).

These terms denote a variant form of Slopeline with transverse or crossbars in contrast to the original form with linear lights only.

Reference: FR Arcata 1949

SLOPE LINE HIGH INTENSITY APPROACH LIGHTING SYSTEM. Among the earliest of terms for Slopeline. Slopeline was employed in some airports in 1948 and nearly approved for general use.

Reference: Slopeline AW 1948

SLOPE LINE SYSTEM OF HIGH INTENSITY APPROACH LIGHTS. A second term from early usage.

Reference: ALPA AW 1949, Slopeline AW 1948

SLOPELINE. A very short form of basic term.

References: New Policy AW 1950, ARL 1981

SLOPE LINE LIGHTS. Is this term equivalent of Slopeline System?

Reference: New Policy AW 1950, Slope Line AW 1948

SLOPE LIGHTS APPROACH LIGHTS/SLOPE-LIGHTS APPROACH LIGHTS. A possible equivalent of Slope Line System.
Reference: Lights Squabble AW 1949

SLOPE & APPROACH LIGHTS. A possible sub-overarching term.
Reference: IES 1987

SLOPE APPROACH. This term is more descriptive than a formal name.
Reference: Kroger 1948

2) Center Line System

General Note. Centerline Systems are now standard. And rarely is the word Centerline included in the title. Early forms, however, very often included the term. In early times Centerline competed with many other forms. The forms in this segment are historic in nature (half-century or older).

CENTER LINE APPROACH SYSTEM. Centerline, like Slopeline, is listed under many terms though few forms are employed by very many of the surveyed sources for this study. This form employed by several sources is a relatively common form. Centerline Line Systems display one row of lights and these are on the extended centerline axis. Transverse or crossbars or lights are a common feature as are sequenced flashing lights. This term is perhaps a descriptive term more than a formal one.

References: Moor AW 1950, USAF AW 1955

CENTERLINE APPROACH LIGHTING SYSTEM/CENTERLINE APPROACH LIGHT SYSTEM. This term employed by two sources in the mid-1950s describes a form that approximates the modern version. Doty refers to it as the "national standard" and contained "Type A" (3000' length with white bar lights), and Type B (2000' length with red bar lights). Warskow has Light instead of Lighting.

References: USAF Pilots AW 1957, Doty AW 1957, Warskow 1950

Other terms that are very similar in appearance include:

CENTER-LINE LIGHTS

Reference: Warskow 1950

CENTER-LINE APPROACH LIGHT SYSTEM.

Reference: Warskow 1950

CENTER LINE SYSTEM.

Reference: Slope Line Aw 1948

CENTER-LINE SYSTEM

References: CAA Pushes AW 1950, CAA Withdraws AW 1950

CENTERLINE SYSTEM.

References: Doty AW 1950, Moore AW 1950, Pilots AW 1950, USAF Pilots AW 1957

CENTER LINE APPROACH SYSTEM.

References: Stone AW 1957, Four Honored AW 1951, Short Takes AI 1994

CENTERLINE APPROACH LIGHTING

Reference: USAF AW 1957

Other Terms of a More Specialized Nature Include These Terms:

CENTER-LINE HIGH INTENSITY APPROACH LIGHT SYSTEM. This earlier term included sequenced flashing lights and crossbars.

Reference: Center-Line Test AW 1950

CENTER ROW SYSTEM.

Reference: Light Squabble AW 1949

CENTER-LINE "CONFIGURATION A" SYSTEM.

Reference: Horonjeff 1962

SINGLE-ROW CENTER-LINE SYSTEM. A descriptive name more than an official name. It may have been used to distinguish it from Slopeline (2-row) and left-hand only Slopeline.

Reference: New Policy AW 1950

CENTERLINE-CROSSBAR CONFIGURATION. A system employing assemblage of several lights for each unit of the line of lights rather than single lamp units.

Reference: Moore AW 1952

CENTERLINE SYSTEM WITH STROBEACON.

Reference: USAF AW 1952

CENTERLINE CROSSBAR SYSTEM. Three Cat I Approach System are included in this form: Modified Calvert, Alpha System (ALS-1), M.I. Cat I System. Reference: IES 1981, Moore AW 1952

3) Other Historic Forms

AGA FUNNEL SYSTEM. Slopeline was also a funnel system but AGA had two rows of single red lights rather than multi-lamp units.

Reference: Kroger AW 1950

ALL-WEATHER APPROACH LIGHTS APPROACH SYSTEM. A descriptive term more than an formal name. It refers to early flashing lights. These lights were of quartz tubing and contained krypton gas. They emitted up to 3.3 billion cp. Reference: Brightest AC 1949

ALPA SYSTEM. Airline Pilots Association proposed a Centerline System long before CAA did. The Alpa bears a substantial resemblance to current models. References: Moore AW 1950, CAA Pushes AW 1950, Finch 1961

ALPA ATA APPROACH LIGHTING SYSTEM. A fuller version of the basic term of Alpa System,

Reference: ICAO AD editions

AIR LINE PILOTS ASSOCIATION (ALPA). This term refers to early centerline proposal which was substitutionally implemented later on.

Reference: FR Arcata 1949

BARRETTE CENTRELINE APPROACH LIGHTING. Replacement name for the originally named Alpa System.

Reference: ICAO AD editions

BARTOW APPROACH LIGHTS. One version of the Bartow System. It is a system by implication.

Reference: Breckenridge 1955

BARTOW LIGHT SYSTEM. Alternate name and possible basic name for this System.

Reference: CAA Tests AC 1945

BARTOW MULTI-ROW APPROACH-LIGHT SYSTEM. This system has sets of double rows: four rows for 1000 feet, three rows for 1000 feet, two rows for 1000 feet, one row to runway. Green for left-hand, Red for right-hand.

Reference: FR Arcata 1949, Kroger 1948

BARTOW SYSTEM. Core name for this System. See other entries beginning with Bartow.

References: CAA 1958, Kroger AW 1948

CALVERT BAR SYSTEM.. This term may contain the word Bar in order to distinguish it from Slopline and other systems lacking crossbars or transverse bars. Calvert has a crossbar and is among Centerline Crossbar Systems which see.

Reference: Approach ... AW 1950

CALVERT CENTRELINE & CROSSBAR SYSTEM. Name comes from the centreline row which is bisected by multiple crossbars. It is also a fuller name for the Calvert System.

Reference: ICAO AD editions

CALVERT SYSTEM. An early Approach Lighting system that combined center-line lights and crossbars.

References: Moore AW 1950, Four Honored AW 1951, Horonjeff 1962,
CD 1978

CIVIL AIRFIELD APPROACH SYSTEM. Addition of the word Civil contrasts the system with the military approach system. Term employed in early 1950s during a time of intense disagreements on the form of Approach Light Systems.
Reference: Pilots ... AW 1952

DISTANCE CODED CENTERLINE APPROACH LIGHTING SYSTEM.
Replacement name for Calvert Centreline & Crossbar System.
Reference: ICAO AD 1953

FUNNEL-SHAPED LIGHTS/FUNNEL-SHAPED SYSTEM. Kroger speaks of AGA's system of lights in the "shape of a funnel." The terms in Part J may have been a way of turning a phrase into a term.
Reference: Part J 2002

FUNNEL SYSTEM. This may suggest the Slopeline System yet Arcata FR does not tie the two together. It appears to be an earlier version of Slopeline. Slopeline employed units of 10 lamps per unit; Funnel seems to have used single units which were green (left-hand) and red (right-hand) in a later edition.
Reference: FR Arcata 1949

LANDING APPROACH LIGHT SYSTEM. A general term from the early 1950s.
Reference: Four Honored AW 1951

LEFT-HAND ROW SYSTEM/DOUBLE-ROW SYSTEM. CAA references are from Federal Airway Plan 1959-63. Terms possibly refer to an old Slopeline System and Single-row left of Center system.
Reference: CAA 1958

MODIFIED CALVERT SYSTEM. A variant form that employs white, red, green lights. All are steady-burning and accompanied by sequence flashing lights.
References: IES 1986, 1987

CALVERT INTERNATIONAL SYSTEM. Young gives this name to the system. Is it the regular system or a version? Young gives alternate names or names of generally unfamiliar names for a variety of Aids.
Reference: Young 1994

CALPA OR ALPERT SYSTEM. Dutch form of early 1960s system that combines Alpa and the Calvert Systems.
Reference: Finch 1961

CALVERT (ENGLISH) SYSTEM. Qualifying term indicates provenance of system.
Reference: Finch 1961

CALVERT SYSTEM OF APPROACH LIGHTS. Variant form of basic term.
Reference: Horonjeff 1962

CALVERT & RAE SYSTEM. This refers to a Glidepath System which see.
Reference: Cook AW 1960

CENTERLINE LIGHTING. Term refers to Centerline Approach Lighting.
Reference: Finch 1961

CONFIGURATION A. Short name of US Standard System, Configuration A.
Reference: Finch 1961

DUTCH SYSTEM. See Calpa System.
Reference: Finch 1961

EFAS, ELECTRONIC FLASH APPROCH SYSTEM. This is not a system in itself but rather part of a larger approach system. It was a component of the then US National Configuration "A".

References: Christian AW 1956, Stone AW 1957

EFAS. Acronym for previous entry.

Reference: Stone AW 1957

HIGH INTENSITY INCANDESCENT APPROACH LIGHTS (ALS)/MEDIUM INTENSITY INCANDESCENT APPROACH LIGHTS (ALS). Term provides differentiation from older neon systems?

Reference: Douglas 1978

INCANDESCENT-LAMP APPROACH SYSTEM. A historic term for a two-row system in line with runway lights. The word incandescent distinguished it from the Neon System.

Reference: IES 1947

INTERRUPTED-SEQUENCE-FLASHING APPROACH-LIGHT SYSTEM (ISF). Term from Arcata experiments. It was a left of center system that alternated flashing lights with neon steady burning lights.

Reference: FR Arcata 1949

LEFT-HAND, SINGLE-ROW, LADDER-TYPE, HIGH INTENSITY APPROACH LIGHT LANES. (Or: "L-H, S-R, Ladder-type program"). Similar in meaning to following entry. Though lanes are perhaps more restrictive than System. Also: Single-line, L-H system.

Reference: CAA Pushes AW 1950

LEFT-HAND-ROW SYSTEM/LEFT-HAND ROW "LADDER SYSTEM." After CAA abandoned Slopeline System they promoted a ladder-shaped arrangement on left side of an extended runway.

Reference: Moore AW 1950

LEFT-ROW SYSTEM. A formal name or descriptive?

Reference: Breckenridge 1955

MULTI-ROW APPROACH-LIGHT SYSTEM. An early system of "8 parallel

rows of controlled-narrow-beam lights arranged symmetrically.” The longest row was located near the threshold while the shortest row were the outer-most. Yellow denoted left of axis, and red for right of axis.

Reference: FR Arcata 1949

NATIONAL SYSTEM. Refers to ultimate system in 1950s: Slopline System, Centerline System.

Reference: Warskow 1950

NEON APPROACH LIGHT/NEON APPROACH-LIGHTS/NEON LIGHT SYSTEM.. Historic terms for early Approach Light Systems utilizing neon tubes.

Reference: Douglas 1979 (1st, 3rd), CD 1978 (2nd)

NEON LADDER/NEON-LAMP-LADDER APPROACH SYSTEM. Historic terms for early Approach Light System utilizing neon tubes.

Reference: IES 1947, Douglas 1978 (1st)

PARALLEL-ROW SYSTEM/PARALLEL ROW APPROACH LIGHT SYSTEM/PARALLEL ROW APPROACH-LIGHT SYSTEM. Long form is historic term from J.B. Bartow in 1930. Both Approach and Runway Lights displayed double rows.

Reference: Douglas 1978 (1st), Douglas 1979 (2nd), Douglas 1978 (3rd)

RAE HORIZON-BAR SYSTEM (RAE). A historic term. A centerline system with transverse bars. Bars are in three groups: outer 1000 feet; then two groups for next thousand feet; one group for inner 1000 feet.

Reference: FR Arcata 1949

ROW-TYPE APPROACH LIGHT SYSTEM. Haber does not specify type of row. Perhaps any (and all) systems with rows are intended.

Reference: Haber 1958

STANDARD APPROACH LIGHT SYSTEM. Term refers to Centerline System which was near widespread approval in 1950.

Reference: Moore AW 1950

SYSTEM OF NEON APPROACH LIGHTS. Descriptive term for experimental study; few details given. It is perhaps more of a descriptive term than an official name.

Reference: CAA Tests ... AC 1945

TWO-ROW APPROACH-LIGHT SYSTEM. Another name for Slopeline System. This term highlights one danger with Slopeline: an air crew might follow one row rather than fly between the two rows.

Reference: Moore AW 1950

U.S. NATIONAL STANDARD CONFIGURATION "A"/U.S. STANDARD, CONFIGURATION A (ALPHA) SYSTEM. Earlier name and form of present day ALSF-1, -2. Second term is a further variant form.

References: Christian AW 1956, Finch 1961 (2nd)

Components of Approach Systems:

WING BAR. Reference: Finch 1961

TERMINATING BAR. Reference: Finch 1961

STEADY-BURNING APPROACH LIGHT. Reference: Finch 1961

One source of airport aids in the past is that of Young's experience of airport aids before and during World War II. A summary is found in his essay on Visual Approach Guidance Indicator Systems. It includes reflections on RAF lighted aids and old systems (pre-World War II and World War II RAF Lighted Aids.) He offers sketches with details on selected aids and brief mention of other Aids.

GLIM LAMP FLARE PATH/GLIM LAMP SYSTEM

DREM MK I AND II [developments of above systems]/DREM SYSTEM

[Later known as DREM LIGHTING SYSTEM. It became the foundation of RAF airfield lighting. Reference: Secret Scotland]

CHANCE LIGHT

MONEY FLARE

INTERNATIONAL LIGHTING SYSTEM

SURFACE ILLUMINATION SYSTEM

TOUCH-DOWN SYSTEM

Young notes that Glim Lamp Flare Path and Drem systems were not maintained over time because such systems required night vision that was severely reduced in combat systems, and because civil systems were resumed after World War II.

Reference: Young, Visual Approach Guidance Indicator Systems JN 1994, Secret Scotland (Drem Lighting System)

1D4 Final Approach Indicators

a) Overarching Terms

APPROACH PATH INDICATOR/APPROACH INDICATOR. Infrequently employed terms that can serve as an overarching term for this category. Source employs both brief and more explicit forms. It can probably serve as an alternate for Final Approach Indicator which see.

Reference: Bagot 2009

APPROACH PATH SLOPE INDICATOR. System of universal nature intended for VASI and PAPI. Seemingly physical apparatus is meant.

Reference: Omnipol

APPROACH VISUAL GUIDANCE SYSTEM. Overarching term for a series of systems including: PAPI, HAPI, Discharge Capacitor Lights (Circling Guidance, Runway Lead-in Lighting Systems, REILS, Sequence Flashing Lighting System).

Reference: Thom-EMI

BAR-TYPE AID. Seemingly a general term for a range of Aids. Specific reference is to PAPI.

Reference: Young 1994

FINAL APPROACH INDICATORS.

Classification: #311

Type of Device: All-lighted aeronautical Aid

Operation: Multiple arrangement of lights indicating degree of accurate glide slope level.

Comment: General Note. Term appears in Part G and Part H. Sources for term not located. Term without Indicator refers to achieving glide slope for aircraft's final approach to runway. It is an overarching term for category in Classification.
References: Part G 1994, Flight Light 2009 (Final Approach)

FOUR BOX PRECISION PATH INDICATOR SYSTEM. Fuller term and one that focusses on physical apparatus and housing.
Reference: FAA FTP 2000

HELIPORT APPROACH PATH INDICATOR (HAPI). PAPI adapted for helicopter operations.
Reference: HD 1994

GLIDE PATH LIGHT INDICATOR. This term refers to light fixtures for PAN, Glide Path Slope System. It is employed in mobile airport lighting System.
Reference: Omnipol

GROUND-BASED VISUAL LIGHT GUIDANCE SYSTEM. An overarching term for all forms of these systems.
Reference: Clark 1981

MEDIUM-INTENSITY HAPI UNIT. More of a description than formal name. It refers to a Philips product. Physical apparatus is referent more than signals.
Reference: Momberger AF 1986

VISUAL APPROACH DESCENT INDICATOR (VADI). For IES this is an overarching term that includes VASI and PAN. It is a "configuration of lights that furnish the pilot with approach slope information during the landing descent."
Reference: IES 1987

VISUAL APPROACH GUIDANCE INDICATOR SYSTEMS. Overarching term for a variety of Indicators including VGPI, TVG, PVG which see.
Reference: Clark 1981

VISUAL GLIDE PATH AID. Overarching term for a variety of Aids such as Tri-

Color, Amber, Calvert & RAE, Double Bar, Mirror System.
Reference: Cook AW 1960

VISUAL GLIDE PATH INDICATOR. Seemingly an overarching term for HAPI, VASI, PAPI.
Reference: HD 1994

VISUAL GUIDE PATH INDICATOR (VGPI). This is a Visual Landing Aid employing a R/W principle. It is also known as Angle of Approach Indicator and VASIS. RAE was primary force in development of this approach. It is possibly a wider term in meaning.
Reference: HD 1988, Clark 1981

VISUAL GUIDE SLOPE INDICATOR. Overarching term for VASI, PAPI, PLASI.
Reference: Vertiport Design 1991

VISUAL GUIDE SLOPE INDICATOR SYSTEM. "Aeronautical lights so arranged as to encompass the beginnings of glide path and thereby create information on vertical azimuth, roll guidance." This term includes VASI and PAPI.
Reference: NATO 1992

b) Precision Approach Path Indicators

PRECISION APPROACH PATH INDICATOR (PAPI). This unit is often referred to by the acronym of PAPI. It is a replacement for the older VASI. ICAO approved it in 1982. The regular form has four units positioned on the left side of runway threshold. It displays red and or white message. Unlike older indicators the color separation are precise so that pink hues are not received by air crew. There are four possible messages with PAPI: if on approach path two whites and two reds are observed. If slightly low then one white and three reds. If far under correct path then four reds. If well above path then four whites. Each unit has two or three projectors. Some sources add acronym to word form.
References: PAPI AI 1984, Latest Dev. AI 1991, AIP 1999, Clark 1981, Airport

Light Eq Cert Prog 1994

PAPI. A frequently employed acronym for Precision Approach Path Indicator. The acronym is employed at least as often as the full name.

References: ADM 1983, AD 1999, AD Vol 1995, FAA AIM 1991, Norway CAA

PRECISION APPROACH PATH INDICATOR (PAPI) SYSTEM. This FAA term is a more precise and complete version employing name, acronym and system.

Reference: PAPI System 1985

PRECISION APPROACH PATH INDICATION LIGHTS. An alternative version of Precision Approach Path Indicator. Is it an informal, descriptive term or an older official term? It is entirely in lower case.

Reference: Mola 2003

PAPI SYSTEM. This term employs both acronym and system thereby more fully indicating the systems character of PAPI. The use of system is employed by several manufacturers.

Reference: ME, ADB

PAPI APPROACH SYSTEM. PAPI is an element of approach systems though this term suggests it is an approach system in its own right.

Reference: Omnipol, Thorn

PAPI LIGHT HOUSING ASSEMBLIES (LHAS). Term for physical components of PAPI.

Reference: Flight Light 2009.

PAPI GLIDE PATH LIGHTING SYSTEM/GPLS. Friedl's fuller title adds additional explanation to the core title. This title is an early designation for PAPI. GPLS suggests an overarching term but it refers only to PAPI for Friedl.

Reference: Friedl AF 1986

PAPI LIGHTS/PRECISION APPROACH PATH INDICATOR (PAN) LIGHTS.

EALS employs Lights rather than Indicator. But the meaning is seemingly unchanged.

Reference: EALS 1999

PAPI-4/PAPI-2. Terms equivalent of PAPI and APAPA: four units for the former; two units for the later.

Reference: IES 1987

PAPI WING BAR. Term refers to physical apparatus for PAPI. Wing Bars contain light apparatus.

Reference: AD 1990

APAPI WING BAR. Term refers to physical apparatus for system.

Reference: AD 1990

ABBREVIATED PAPI. This system consists of two lights rather than the four of PAPI.

Reference: Ap Light Eq 1986

ABBREVIATED PRECISION APPROACH PATH INDICATOR (APAPI).
A formulation that includes both word form and acronym.

Reference: Lexicon 1986

APAPI. Abbreviated form of PAPI. Two units instead of four.

Reference: AD 1999, AD Vol H 1995, Devasenapathy IJ 1994

MINI-PAPI. A form of PAPI that is substantially smaller in size. A product of Thom-EMI.

Reference: PAPI AI 1984

CHAPI/CHAPI SYSTEM. A helicopter version of PAPI. Some firms add a green light that adds "descent-rate" data.

Reference: C-H, PAPI, AI 1984, Cegelec (2nd)

PORTABLE PAPI. A component of portable Airport Lighting System (for

temporary use or standby status).

Reference: Slo-Idman

THREE-LAMP PAPI. A term in an older source that lacks details. Possibly a three-color form?

Reference: Momberger AF 1986

c) VASI Systems

1) Forms

VISUAL APPROACH SLOPE INDICATOR (VASI). Final approach indicators provide approach slope data during the time a plane is descending. VASI has been a major form of this Indicator type for many years. VASI types include the basic form of a 2-Bar System with a R/W lighted panel. A plane on target will see white in the downwind unit and red in the upper unit. Above glide path the crew will see two white lights and if low then two red messages. Frequently the acronym of VASI or VASIS (2nd "S" for System) is employed. The acronym is omitted by AD Vol II.

References: IES 1987, PAPI AI 1984, ADM 1983, AD Vol II 1995

VISUAL APPROACH SLOPE INDICATOR (VASI) SYSTEM/VISUAL APPROACH SLOPE INDICATOR SYSTEM. This version of the title is slightly more expansive in scope by including System in the title.

References: ADS-Site 1973, Spec for L-851 1972, Multi-Electric, AD Vol 1995

VISUAL APPROACH SLOPE INDICATOR SYSTEM (VASIS). A slightly nuanced variant title for this Navaid. ADM lacks acronym.

References: Clark 1981, AD 1999, ADM 1993

VISUAL APPROACH SLOPE INDICATOR SYSTEM. A nuanced variant form of the basic term. Several sources use this version; most are makers.

References: Cegelec AI 1992, ADM 1983, GE, Lexicon 1986

VASI. Acronym for Visual Approach Slope Indicator. It often stands alone.

Reference: Airport Lighting ASM 1978

VASI APPROACH INDICATORS. A general, somewhat informal term for VASI?

Reference: Young 1994

VASI-TYPE APPROACH AIDS. Informal term for systems similar to VASI? Variant forms of terms appear in Young in several instances.

Reference: Young 1994

VASI SYSTEM. Acronym accompanied by the word System.

Reference: IES 1981, ME, Sepco

VASIS. Acronym for Visual Approach Slope Indicator System. Only a limited number of references employ this term; a single US source is included.

Reference: AD 1971, 1990, H & P, ADM 1983

A-VASIS. Term that refers to Abbreviated VASIS.

Reference: Devansenapathy IT 1994

AVASIS. Acronym for Abbreviated VASIS.

Reference: Clark 1981, ADM 1983

ABBREVIATED VISUAL APPROACH SLOPE INDICATOR. Approved Lighting Equipment lists the term; explanations not included in that publication.

Reference: Ap L Eq 1968

ABBREVIATED VISUAL APPROACH SLOPE INDICATOR SYSTEM (AVASIS). A variant form that adds acronym.

Reference: Lexicon 1986

SAVASI. Acronym for Simple Abbreviated VASI.

References: ADS-Site 1971, Sepco

RT-VASIS. RT-VASIS= Reduced T-VASIS which see.

Reference: Clark 1993

R-W VASIS. A fuller, more precise name for VASIS.

Reference: C & C 1981

AT-VASIS. An abbreviated version of T-VASIS which see.

References: Clark 1981, ADM 1983

T-VASIS LIGHT UNITS (BLADE TYPE)/T-VASIS LIGHT UNITS (PROJECTOR TYPE). Term includes the physical apparatus that makes up T-VASIS.

Reference: ADM 1983

T-VASIS/TEE VISUAL APPROACH SLOPE INDICATOR. A system that in some modes display a "T" shaped indication. When on correct path two white lights are displayed on both side of the runway. If above then one of three messages: one for slightly above, two for moderately above, and three well above (for an inverted T). If below correct level the messages are reversed. Clark describes a final message of "Gross Undershoot Signal" for danger. This is a T-shaped message.

References: Clark 1981, ADM 1983, AD 1999, P & B 1988

2) Vasis: Types

General Note. The VASI System consists of many forms ranging from simple to complex. The various groups and designations are here described. Notes are included as needed. The primary terms offer an explanation of the workings of VASI.

VASI-2/VASI-4/VASI-6/VASI-12/VASI-16. The basic level consists of just two boxes while additional units up to 16 offer a more complex configuration.

References include a variety of FAA A/C, WS 1981, Katz 1989

VASI-II/VASI-IV/VASI-VI [3-BAR]/VASI-XII/XVI[3-BAR]. Sepco offers a different format employing Roman numerals.

Reference: Sepco

2-VASIS. H & P offers a slight variation of the regular formulation.
Reference: H & P

12-BOX VASI/12-BOX VASI SYSTEM. Reformulation of basic formulation of VASI-12.

4-Box VASI. A variant formulation of the basic terminology of bars.
References: Sepco, IES 1972

2-BOX VASI. A variant formulation of the basic terminology of bars.
Reference: IES 1972

2-BAR VASI/2-BAR VASIS/3-BAR VASI/3-BAR VASIS/2-BAR SYSTEM/3-BAR SYSTEM. Variant formulation of basic term that employs Bar rather than Box.
References: AT 1991, IES 1981, Clark 1981

VASI-2ND LIGHT BAR/VASI 1ST LIGHT BAR.
Reference: ADS-Site 1969, 1971, 1973, 1980

2-BAR SYSTEM (VASI-2, -4, -12)/3-BAR SYSTEM (VASI-6, -16). Alternate formulations of basic terms.
Reference: IES 1987

STANDARD VASIS. Older ICAO AD describes the standard form as having a 12 light configuration. Other forms were not listed as VASIS.
Reference: ICAO AD 1964

d) Other Forms

1) Glide Path Forms

APPROACH-ANGLE LIGHTS. A form of heliport glide slope Indicator. A historic term.

Reference: Breckenridge 1955

GLIDE PATH INDICATOR. For Cegelec this is known as the Helicopter Glide Path Indicator. It is a Tri-color system displaying: red, green, yellow.
References: HD 1994, CAA Tests AC 1945, AIP 1999

GPI. This is an acronym for Glide Path Indicator.
Reference: Cegelec

GLIDEPATH INDICATOR. This term, with Glidepath as one word, appears to be an overarching term. However, it instead refers to a specific Heliport Aid by Officine Paneri (Italy). Few details are available.
Reference: Latest Developments AI 1991

PRECISION VISUAL GLIDEPATH (PVG). A term from 1950s. It consisted of two bars of white lights flashing on runway (above threshold). Third bar of amber lights placed near threshold. Alignment of white and amber indicates on glidepath.
Reference: Clark 1981

PULSATING SYSTEM. One unit, two-color Visual Approach with these messages: above=pulsating white; below: red, steady. Well below: pulsating red light. On=white, steady. Pulsating rate: varies according to position above, below, on course.
Reference: AIM 1999

PVG. Acronym for Precision Visual Glidepath.
Reference: Clark 1981

PVG SYSTEM. Acronym joined by system. This Aid contains a limited number of parts yet it is an integrated unit and thereby a system.
Reference: Clark 1981

TEE SYSTEM . Presumably Tee Visual Glidepath Aid employing short form and system in the title.

Reference: Clark 1981

TEE VISUAL GLIDEPATH. (TEE or TVG). It is a combination of aspects of PVG and AAI Systems. ICAO's T-VASIS is very similar.

Reference: Clark 1981

TVG. Acronym for Tee Visual Glidepath.

Reference: Clark 1981

2) Tri-Color Forms

TRI-COLOR GLIDE PATH INDICATOR. Aid employed by RAF in World War II. PLASI and HAPI are also three-color Aids.

Reference: Clark 1981

TRI-COLOR SYSTEMS. A category in AIM 1991 which seemingly presents a single form: Tri-Color Visual Approach Slope Indicator which see.

Reference: AIM 1991

TRI-COLOR VISUAL APPROACH SLOPE INDICATOR. A three-color system in amber, green, red. Messages: When amber is present pilot above glide path; when red present then below the glide path. When green visible then on glide path.

Reference: AIM 1991

3) Fresnel Forms

NAVY FRESNEL SYSTEM/NAVY FRESNEL LENS OPTICAL LANDING SYSTEM/FRESNEL LENS OPTICAL LANDING SYSTEM, FLOLS/FLOLS, FRESNEL LENSE OPTICA LANDING SYSTEM. This Aid is used on aircraft carriers. It is comprised of two colors: yellow and green. There are 12 green units and one yellow bar. Both colors need to be in alignment. When the yellow bar is above the green units the plane is above the glide slope. When yellow below the green then the plane is too low. There are also red lights that indicate: do not land.

References: IES 1966, IES 1972, Clark 1981

FRESNEL SYSTEM. A shorter term for Fresnel Lens Optical Landing System.
Reference: IES 1966

MDLA, MIRROR DECK LANDING AIDS. See also Fresnel, Navy Fresnel.
Lamp reflected off of mirror. Light perceived as a "central spot of light."
Accompanied by light which may be amber. Central light (green) needs to be
aligned with accompanying lights.
Reference: Clark 1981

MIRROR SYSTEM. FLOLS is a modified version of this Aid though not
explained.
Reference: IES 1966

4) PLASI Forms

HAPI-PLASI. This is a helicopter version of PLASI.
Reference: Devore

HELI-PLASI. A form of PLASI for helicopter operations.
Reference: PAPI AI 1984

PLASI. Acronym for Pulse Light Approach Slope Indicator.
Reference: Norway CAA

PLASI I, II. Roman numerals denote cooling systems with II indicating extreme
climate use.
Reference: Ap L Eq 1986, Devore

PORTABLE PLASI. A temporary unit when other systems are not working.
Reference: Pollock A.I. 1990

PULSATING VISUAL APPROACH SLOPE INDICATOR. AIM 1999 gives this
variant formulation for PLASI. PLASI means Pulsating in this form rather than
Pulsed or Pulse Light Approach Slope Indicator.

Reference: AIM 1999

PULSE LIGHT APPROACH SLOPE INDICATOR (PLASI). A one box system in which pulses increase with deviation from glide path. Steady white light indicates on path; red indicates far below path.

References: Clark 1981, PAPI AI 1994

PULSED LIGHT APPROACH SLOPE INDICATOR. FAA has Pulsed but manufacturer, Devore, has Pulse.

Reference: Ap L Eq 1983

5) Miscellaneous Forms

AAI SYSTEMS. Acronym for Angle of Approach Indicator which see.

Reference: Clark 1981

ALIGNMENT OF ELEMENT SYSTEM. A simple unlighted Landing Aid: painted panels of plywood are painted either in black and white, or fluorescent orange. When three panels are in alignment plane is on glide path. If middle panel above the flanking panels then the pilot is above the correct position; if middle panel below flanking panels the pilot below desired angle of descent.

Reference: AIM 1991, AIP 1991

ANGLE OF APPROACH INDICATOR (AAI). This Aid displays light that indicates "[t]he desired angle of descent during an approach." It is a R/W system.

Reference: NATO 1992

ANGLE OF APPROACH LIGHT/ANGLE-OF-APPROACH LIGHT. Indicates glide path: Green=on; Red=low; Yellow=high.

Reference: AD 1953

DESCENT INDICATOR. An alternate name for Angle of Approach Indicator?

Reference: Young 1994

GENERIC VISUAL APPROACH DESCENT INDICATOR.

Reference: Generic Vis GI SI Ind 1988

GENERIC VISUAL GLIDESLOPE INDICATOR (GVGI). GVG provides visual glideslope guidance at general aviation airports.

Reference: Generic Vis GI SI In 1988

OPTICAL PROJECTOR GROUND AIDS. An early Aid giving glide slope data: Green=on correct path, Red=high, Amber=low.

Reference: Clark 1981

OPTICAL ILS. This system is a combination of PAPI and SAGA which see.

Reference: Thorn

PULSATING SYSTEMS. This term refers to a single-unit Aid with two colors. When on glide path the message is steady white. When slightly below then steady red. When above, pulsating white and below is denoted by pulsating red.

Pulsating rate denotes distance from correct glide path.

Reference: AIM 1991

PULSE CODED OPTICAL LANDING AID. According to Clark this is one form of Aid which employs projected sectors that are color or flash coded. Employed for helicopters and airports with less intense operations.

Reference: Clark 1981

SAGA (SYSTEM OF AZIMUTH GUIDANCE FOR APPROACH). "Combined signal of approach azimuth guidance and runway threshold identification lights (REILS)." Two unidirectional rotating units near corners of threshold. Depending on plane's position either the RT or AAG function is activated.

Reference: Thom-EMI

STANDARD VISUAL APPROACH GUIDANCE AID. Term refers to PAPI as having the status of the standard aid.

Reference: Cegelec AI 1992

VISUAL APPROACH DESCENT INDICATOR (ROTARY WING). Former

name for GVADI.

Reference: Ap L Eq 1985

VISUAL ANGLE OF APPROACH INDICATOR. An overarching term for VASI and Navy Fresnel System.

Reference: IES 1966

VGSI. Terms are interchangeable; two systems can interchange optical assembly. Word forms in other sources refers to an overarching term that includes several forms.

Reference: GE 1965; see Vertiport Design 1991

Chapter 1E Runway & Taxiway Lighting

1E1 Runway Lighting

a) Overarching Terms

General Note. There are several overarching terms for this category yet numerous sources do not employ them. In many instances specific terms (e.g., Running Edge Light, Runway Centerline Light) are used but not general terms. In some instances what appears to be overarching terms are short forms of a specific term (e.g., Runway Lighting system for High Intensity Runway Lighting Systems). Composite terms are also employed on occasion. In some instances general terms are in use (e.g., Airport Lighting).

RUNWAY LIGHTING. A few FAA sources employ this term. It strongly suggests a system of integrated lights for a common purpose. Yet the actual usage refers to a specific usage. A second and dated source employs the term in an encompassing term. Friedl includes an inventory of forms: Threshold TDZ, Centerline, Runway Edge, Runway End Lights.

References: Med Int Rnwy L Sys & VASI for Utility Airp 1970, Stol Port 1970, Design 1970, Friedl 1986

RUNWAY LIGHTS. This term can refer to a singular light though in most cases it refers to a group of Lights (and probably an integrated group). A variety of sources, many of US provenance, employ the term. Older sources from the 1940s to the 1960s also employ the term. But many newer sources do not. Possibly because of a preference for specific terms. Yet, other sources, conversely, employ more overarching terms such as Airport Lighting.

References: Doty AW 1957, AIP 1991, FAA ADS-Site 1969, CD 1979, D & B 1977

RUNWAY LIGHTING SYSTEM. This would appear to be a core term for a system of Runway Lights. Yet there is only limited use of the term. Two older sources include the term in a discussion of the development of Runway Lighting Systems. One FAA source uses it as a shorter form for High Intensity Runway

Lighting Systems.

References: CAA Will Test ... AW 1956, Cook AW 1960, HI L Sys 1965,
Warskow 1950

RUNWAY AND TAXIWAY LIGHTING

General Note. Basic classification terms becomes problematical in a variety of instances. The needs of classification can be at variance with the terms of the database. The classification lacks a basic entry under the above title. Terms can be amalgamated in some cases yet only a portion of a given form may be represented. The two representative terms can represent many forms of these Lights even if a single term cannot.

Reference: Seemingly no specific reference for this term. It is also employed in the first edition of this study. Internet search (Google) includes the term but as two terms connected by &/and which are not part of the term(s). Kellysearch.com has a category under the heading of Airport Runway & Taxiway Lighting Systems Design.

Classification #: 321 (Runway & Taxiway Inset (Pavement) Lights
322 (Runway & Taxiway Elevated Lights)

Form of Device: Non-flashing partially-lighted unit.

Operation: Devices indicate approved surfaces for aviation activities. Many variant forms in use with different mechanism, color and message appearance.

Comments: Classification based on physical apparatus and type of light. Basic terms of database do not fully mesh with classification. See also general note.

RUNWAY VISUAL AIDS. This may be more of a general overarching term. Though seemingly it can be a near synonym for Lighted Aids.

Reference:

IN-RUNWAY LIGHTING. A general term for one source. It includes Touch-down Zone, Runway Centerline, Runway Remaining, Taxiway Turnoff Lights.

Reference: AP 1990

PRIMARY AIRFIELD LIGHTS. Seemingly an overarching term for Runway and Taxiway Lighting.

Reference: Momberger AF 1986

RUNWAY/MOS LIGHTING. (MOS= Minimum Operating Stripe). This Aid is part of Emergency Airport Lighting System (EALS).

Reference: EALS 1990

b) Runway Edge Lights

RUNWAY EDGE LIGHTS. A pattern of lights that outlines vertical and horizontal boundaries of landing area for night use and during poor daytime conditions. Lights are steady-burning and white in color. For displaced thresholds the light consist of red lights. Yellow lights are employed for part of the runway (opposite end of approach direction). For ICAO lights are employed day and night under certain conditions. ICAO speaks of fixed lights which has the meaning of steady-burning. Finch offers a full view of the forms of these Lights: Low Intensity (1000 cp), Medium intensity (1000-10000 cp), High Intensity (10000-100000 cp). Heights include: Low-profile (no more than 1" above pavement), Flush (1 3/4"), Semi-Flush (3 1/2"), Elevated (30").

References: IES 1981, AD 1990, AIM 1991, D & B 1977

RUNWAY-EDGE LIGHTS. Several sources offer a hyphenated version of the basic term.

Referencees; ADM 1993, D & B 1977, Douglas 1978

RUNWAY EDGE LIGHT SYSTEM. The addition of the word System makes the basic term more precise. AIP refers to amber than yellow for the last 2000 feet. See Railway Signal monograph, Part F, for a discussion of amber and yellow. AIP includes HIRL, MIRL, LIRL forms within this term.

Reference: AIP 1991

RUNWAY EDGE LIGHTING/RUNWAY EDGE LIGHTING SYSTEM. IES offers a variant form of the term employing Lighting instead of Light. The meaning seems unchanged. Friedl and Momberer omit System.

References: IES 1972, Friedl AF 1986, Momberger AF 1986

RUNWAY OUTLINE LIGHTS. Term appearing in a paper on development of Lighting. Possibly broader in scope than Runway Edge Lights.
Reference: Finch 1961

STANDARD LIGHTS/STANDARD EDGE LIGHTS. Doubtful terms. Finch refers to Runway Edge Lights that are Standard or Standard Edge. Apparently these differentiate from non-standard forms.
Reference: Finch 1961

These are Runway Edge Light terms without the word Runway. They are part of the category though in an implicit mode. The terms include:

EDGE LIGHTS/EDGE-LIGHTS. Reference: IES 1966, 1987, Pollock 1990,
Horonojeff 1962, D & B 1977

EDGE LIGHTING. Reference: McKelvey JN 1987

EDGE LIGHTING SYSTEM. References: "Short Takes", AI 1994, Finch 1961

ELEVATED EDGE LIGHTS. References: IES 1981, A & W 1992

LOW INTENSITY EDGE LIGHTS. Reference: IES 1972

c) Runway Centerline Lights

AIRPORT CENTERLINE LIGHTS. An older term for Runway Centerline Lights. A possibly workable term before the advent of Taxiway Centerline Lights.
References: Ap L Eq 1966, 1968, 1973, Spec for Seq Fl L 1975, Spec for L-843
Airp In-Rnwy TDZ L 1964

CENTERLIGHTS. A term for Runway Centerline (Flush) Lights from Philips, an Aids maker.
Reference: Momberger AF 1986

CENTERLINE LIGHTS. This term is part of Runway Lighting.
References: Instal Details 1975, Maint Vis Aids 1982, A & H 1979, CD 1979,
D & B 1977

CENTERLINE LIGHTING SYSTEM. This term from an older edition of

Approved Lighting Equipment predates Taxiway Centerline Lights.
Reference: Ap L Eq 1968, D & B 1977

CENTERLINE GUIDANCE LIGHTS. A possible reference to Runway Centerline Lights.
Reference: Finch 1961

CENTERLINE RUNWAY LIGHTS. A near-historic source and one that places Centerline before Runway. This is an infrequent practice.
Reference: Centerline Runway AW 1951

CENTRE LINE LIGHTS. British English spelling of basic term.
Reference: D & B 1977 (8th Air Nav. Conference)

RCLS. Acronym for Runway Centerline Light System.
Reference: Douglas 1979

RUNWAY CENTRELINE LIGHTS/RUNWAY CENTRE LINE LIGHTS. While Runway Edge Lights are a basic feature of most airports, Centerline Lights are not found at all airports. This term, in British English, is from ICAO. According to ICAO these Lights are provided For CAT II and III PAR operations. They are fixed (or steady-burning) and are of variable white color. The lower end of the runway has variant color patterns. From 900 to 350m the lights alternate between red and white; the last 350m are red only.
References: AD 1976, ADM 1993, AD 1999 (2nd)

RUNWAY CENTERLINE LIGHTS. This term can refer to individual units though the term can also refer to a system of such Lights.
References: Instal Details 1975, HI L Sys 1965, AD 1979, D & B 1977

RUNWAY CENTERLINE LIGHTING (RCLS). This term occupies an intermediate state between Lights and Lighting System. The meaning is probably unchanged. Friedl omits acronym.
References: AIP 1991, AIM 1991, Friedl AF 1986

RUNWAY CENTERLINE LIGHTING SYSTEM/RUNWAY CENTERLINE LIGHTING SYSTEM. This term is more explicit from the vantage point of systems. Sources and explanation are more in the US mode. They are employed on some PARs. The light are 50 feet apart and positioned on the centerline. They are white in color except the last 3000 feet: first 2000 are white and red; last thousand feet are red only.

References: IFH, AIP 1999, AD 1993 (2nd)

d) Threshold, Touchdown Zone, Runway End & Other Lights

General Note. There are a variety of specialized Lights associated with runway operations. They are associated with Edge and Centerline Lights yet have a distinctive character. These various Lights are grouped together in this segment.

“NARROW GAUGE” PATTERN. Early form of TDZ Lights.

Reference: Finch 1961

ROAD-HOLDING POSITION LIGHT FOR VEHICLES. Term for Traffic Signals for motor vehicles in aircraft operation areas. Red/green or Flashing-red Lights of regular Traffic Signals are employed.

Reference: AD 1990

RUNWAY TOUCHDOWN ZONE LIGHTS/RUNWAY TOUCHDOWN ZONE LIGHTS (TDZ). These are a series of transverse Light Bars (3-barrette unidirectional units) flanking the lower end of Centerline Lights. They are installed for some PARs and denote the zone in poor visibility. A variety of sources refer to Touchdown Zone Lights minus the word Runway. ICAO adds Runway thereby increasing the specificity of the term.

References: AD 1990, AIP 1999, Lexicon 1986, AD 1999 (2nd)

TOUCHDOWN ZONE LIGHTS. A more common version of Runway Touchdown Zone Lights though less explicit in meaning. FAA Maintenance Guide refers to maintenance and possibly that usage suggests individual units not TDZ as a system.

References: ADS-Site 1969, AIP 1991, CD 1979, D & B 1977, AD 1999, Apr

Airp L Eq 1966, Maint Guide for Det Degr 1971

TOUCHDOWN ZONE LIGHT SYSTEM. A version of the basic term that includes System in the title though not Runway.

References: Stand for Airp Signs 1991, Part G 1992

TOUCHDOWN ZONE LIGHTING. Presumably the equivalent of those touchdown zone terms employing Light.

Reference: ADM 1993

TDZL. Acronym for Touchdown Zone Lighting System.

Reference: Douglas 1979

TDZ LIGHT BAR. Term refers to physical apparatus more than to morphological dimension.

Reference: Stand for Airp Signs 1991

AIRPORT IN-RUNWAY TOUCHDOWN ZONE LIGHT. Term appears in list of approved terms. A more complete term though no description is available.

Reference: Ap L Eq 1973

RUNWAY END LIGHTS. This term refers to Lights marking the end of a runway. They are of a fixed or steady-burning character in red and face toward the runway. Runway End and Threshold Lights often share the same fixture.

Reference: IES 1972

RUNWAY THRESHOLD LIGHTS. These are fixed, unidirectional Lights. They are located near the outer end (threshold) of the runway. They face the approach direction and emit steady-burning green messages. Threshold Light is a more common term. They denote the threshold for approach aircraft.

References: IES 1980, ICAO 1990

RUNWAY THRESHOLD & WING BAR/RUNWAY THRESHOLD & WING BAR LIGHTS. ICAO includes this combined term. Wing Bars are added lights provided where more illumination is needed.

Reference: ICAO 1990, AD 1999

THRESHOLD/END LIGHTS/THRESHOLD/END LIGHTING. Runway End and Threshold Lights often share the same fixtures. EALS conjoins the names of two forms.

Reference: EALS 1999

THRESHOLD LIGHTS. Shorter form of full term though more commonly used. It can refer to individual units and it can refer as well to a system of Lights.

References: Centerline Runways ... AW 1951, Doty AW 1951, Spec for R & T Edge L. 1995, HI Rnwy L Sys 1973

THRESHOLD LIGHTING. This term probably refers to a system of Threshold Lights. Confusion is possible since variations of this form of Light have a similar if not identical meanings. Lights are positioned at base of runway. Two wing bars flank the runway; a second group is positioned at the base of the runway. Lights alternate green and yellow; back side is red.

References: IES 1981, ICAO 1990, HI Rnwy L Sys 1965, 1973, Stol Ports 1970

END LIGHTS/END OF RUNWAY LIGHTS. Variant forms of the basic term that lack the word Runway.

References: Spec for R & T Edge L 1975 (R), Maint of Airp Vis Aid Fac 1982 (L)

LIGHTS, RUNWAY END. A more bureaucratic formulation of the basic term beginning with general term and ending with specifics.

References: Airp L Eq Cert Prog 1994

RUNWAY REMAINING LIGHTING/RUNWAY DISTANCE REMAINING. A few source give a separate name to the Lights for the lower end of runways that have two-color light configurations.

References: AIM 1991, AIP 1990 (L), Stol Ports 1970 (R)

EXIT TAXIWAY LIGHTING. ADM has a category under this name which includes Taxiway Lights. The term refers to Taxiway Light which carry out exit

functions.

References: ADM 1993

TAXIWAY TURNOFF LIGHTS. This Light is a Taxiway Exit Lights for ICAO and other sources. Yet AIP lists it with Runway Lighting.

Reference: AD 1985

TAXIWAY LEAD-OFF LIGHTS. This Light has a meaning similar to that of the previous term. It displays green and yellow lights that conforms to Taxiway Centerline Light including Taxiway Exit Lights.

Reference: AIP 1999, AIM 1999

TAXIWAY TRAFFIC SIGNALS. Term from 1930s-1940s era. Such Signals probably control land movement for aviation operations.

Reference: Breckenridge 1955

STOPWAY LIGHTS. These are Lights of an unidirectional character. Red light controls stopway on taxiway exit.

Reference: AD 1990, Lexicon 1986

e) Runway Equipment Terms

General Note. These terms are generally both physical and morphological in nature. There are several terms that recur with Lights terms. These terms are divided into general terms and specific terms. References are found with terms employing equipment terms.

1) General Terms

BIDIRECTIONAL. Two-directional Light apparatus.

ELEVATED. Units other than in-pavement. It may be some inches off pavement. Lighted mounted on pipes or conduits.

OMNIDIRECTIONAL. A Light that can be viewed 360 degrees.

UNIDIRECTIONAL. Light apparatus for single direction only

Light fixtures which can safely be run over have had a variety of seemingly interchangeable names. An explanatory note in Part G (page 57) offers an overview of terms and meanings.

FLUSH

FULL-FLUSH

SEMI-FLUSH

IN-PAVEMENT/INPAVEMENT

IN-RUNWAY

INSET

SEMI-BURIED (“SEMI-ENCRASTE”)

SEMI-FLUSH/SURFACE

2) Physical Apparatus Terms

General Note. These terms are related to previous segment. Terms with focus on morphological are separate. The terms have strong links to physical terms though not all differences are always present. Limited entries.

AIRPORT IN-RUNWAY LIGHT.

Reference: Ap L Eq 1966, 1968

AIRPORT IN-RUNWAY TDZ LIGHT.

Reference: Spec for Seq Fl Airp L 1975

BIDIRECTIONAL CENTER LINE FIXTURES.

Reference: Maint Guide for Det Degr 1971

BIDIRECTIONAL HIGH/MEDIUM-INTENSITY RUNWAY LIGHT. Intensity

according to size of lamp (45w for MI; 200w for HI).

Reference: Momberger AF 1986

BIDIRECTIONAL SEMIFLUSH INSET LIGHT ASSEMBLY.

Reference: FAA Spec L-850, L As Rnwy Ctr 1966

ELEVATED EDGE LIGHTS.

Reference: Douglas 11-20-77

ELEVATED LIGHTS.

Reference: AD Vol II 1995, Vertiport 1991

ELEVATED RUNWAY LIGHT

Reference: ATA 1946, Horonjeff 1962

ELEVATED RUNWAY EDGE LIGHT.

Reference: ATA 1946, Horonjeff 1962

ELEVATED THRESHOLD LIGHT.

Reference: Horonjeff 1962

FIXED FOCUS BIDIRECTIONAL HIGH INTENSITY RUNWAY LIGHT/
FIXED FOCUS UNIDIRECTIONAL HIGH INTENSITY RUNWAY LIGHT.

References: HI L Sys 1965, Ap L Eq 1966

500 WATT HIGH INTENSITY RUNWAY LIGHT WITH AUTOMATIC
BEAM CONTROL. A term with nearly every element in the title.

Reference: Ap L Eq 1966

FLASH LIGHTS. Alternative name for Sequence Flashing Lights or Strobe
Light?

Reference: Momberger AF 1986

FLUSH CENTERLINE LIGHT.

Reference: Momberger AF 1986

FLUSH LIGHT. Term employed for multiple functions including Centerline, TDZ, Approach, Threshold, Runway-end functions.
Reference: Momberger AF 1986

IN-RUNWAY LIGHT FIXTURE.
Reference: Spec for L-845, Seq Fl Ins Prism Airp L, 1964

IN-RUNWAY LIGHTS.
Reference: AIM 1991, AIP 1991

INSET LIGHT.
Reference: Vertiport 1991, Momberger 1986, ADM 1993, AD Vol II 1995, Lexicon 1986

LIGHT ASSEMBLY, AIRPORT RUNWAY CENTERLINE & TDZ/LIGHT ASSEMBLY, AIRPORT RUNWAY, CENTERLINE & TDZ ZONE/LIGHT ASSEMBLY, AIRPORT RUNWAY & CENTERLINE.
Reference: Ap L. Eq 1968 (L), Spec for Seq Fl Airp L 1975 (C), FAA Spec L-850, L As Rnwy Ctrl, 1966 (R)

LIGHT ASSEMBLY, AIRPORT TAXIWAY CENTERLINE.
Reference: Ap L Eq 1968

LIGHT, PORTABLE RUNWAY.
Reference: Ap L. Eq Cert Prog 1995

LIGHTS, RUNWAY EDGE LOW INTENSITY.
Reference: Ap L Eq Cert. 1994, Ap L Eq 1976

LIGHT, RUNWAY, IN-PAVEMENT.
Reference: Ap L Eq Cert 1994, Ap L Eq 1976

MULTIPLE-PURPOSE ELEVATED LIGHT. Runway & Taxiway Edge Light.
Reference: Momberger 1986

NARROW GAUGE RUNWAY LIGHTS/NARROW GAUGE LIGHTING SYSTEM (RUNWAY). Refers to Lights employed in testing, but there is little information on meaning of term.

Reference: Doty 1957, Lexicon 1986 (2nd)

OMNIDIRECTIONAL LIGHTS. Physical apparatus of an overarching nature. Douglas notes that early visual Landing Aids followed that configuration. Some current Lights are omnidirectional though unidirectional, bidirectional forms also in use.

Reference: Douglas 1978

PORTABLE EDGE LIGHT.

Reference: Spec for Port Runwy L 1978.

PORTABLE RUNWAY END IDENTIFIER LIGHT.

Reference: Spec for Port Rnwy L. 1978

RADIO-CONTROLLED RUNWAY EDGE LIGHT. Temporary Landing Strip Lights in emergency situations.

Reference: Momberger AF 1986

RNWX/LGTS. Abbreviations for Runway Lights.

Reference: NOTAMS 1993

RUNWAY IN-PAVEMENT LIGHT/RUNWAY INPAVEMENT LIGHT.

Reference: Spec for R & T L Fix 1984

SEMIFLUSH AIRPORT LIGHT/SEMIFLUSH AIRPORT LIGHTING.

References: Maint of Airp Vis Aid Fac 1982, Spec for L-838, Prism Ap L 1964

SEMIFLUSH INSET PRISMATIC LIGHT.

Reference: Spec for L-845 Seq Fl L Ins Prism Ap L 1964

SEMIFLUSH INTERSECTION LIGHT.

Reference: HI Rnwy L Sys 1973

SEMIFLUSH LIGHT.

Reference: HI Rnwy L Sys 1973, CD 1979

SEMIFLUSH PRISMATIC AIRPORT LIGHT/SEMIFLUSH INSET
PRISMATIC AIRPORT LIGHT.

References: HI L Sys 1965, Ap L Eq 1966

STANDARD HIGH INTENSITY RUNWAY LIGHTING. Term is more of a descriptive term than an official name. Suggests standard and approved ideas on Lighting rather than experimental forms.

Reference: Warskow 1950

UNIDIRECTIONAL LIGHTS.

Reference: ADM 1993

UNIDIRECTIONAL SEMIFLUSH INSET LIGHT ASSEMBLY.

Reference: FAA Spec L-850, L As Rnwy Ctr 1966

UNIDIRECTIONAL THRESHOLD LIGHT.

Reference: Spec for Seq Fl Aip L 1975

UNIDIRECTIONAL TOUCHDOWN ZONE LIGHT FIXTURE.

Reference: Main Guide for Det Deg 1971

2) Terms By Intensity

General Note. Light terms often include the intensity of the Light. Intensity can have reference to candle power of the light source, the type of lens, the level of aviation operations.

ELEVATED HIGH INTENSITY RUNWAY LIGHT FIXTURES. This term includes physical apparatus as well as intensity in title. Term refers to Edge Light.

Reference: HI Rnwy L Sys 1973

HIGH-INTENSITY BIDIRECTIONAL INSET LIGHTS. Lights are within the context of Runway Centerline Lights.
Reference: Momberger AF 1986

HIGH INTENSITY, ELEVATED TYPE D-1 LIGHTS. Physical apparatus for Approach and Runway Edge Lights.
Reference: Douglas 1979

HIGH-INTENSITY LIGHTS. A somewhat overarching term for a series of Lights produced by AEG.
Reference: Momberger AF 1986

HIGH INTENSITY LIGHTING SYSTEM. This system refers to Approach and Runway Lighting.
Reference: Douglas 1979

HIGH INTENSITY RUNWAY LIGHTING. Older Lighting of this form in the US was of three forms: L-818 (500w), L-819 (200w), L-820 (95w Sealed Beam, and 45w Conventional).
Reference: Warskow 1950

HIRL. Acronym for US High Intensity Runway Light System.
Reference: Douglas 1979

HIGH INTENSITY LIGHT SYSTEM/HIGH INTENSITY RUNWAY LIGHT SYSTEM. Both terms refer to Elevated Lights for edge of instrument runways; also high-volume non-instrument runways. The second has a more complete meaning.
References: HI Rnwy L Sys 1973, CD 1979 (L)

HIGH INTENSITY RUNWAY EDGE LIGHTS/HIGH-INTENSITY RUNWAY EDGE LIGHTS/RUNWAY HIGH-INTENSITY EDGE LIGHTING SYSTEM.
Reference: Spec for L-838 Pr Ap L 1964, Spec for L-845, Seq Fl Ins Pr Airp L, 1964, Seq Fl Inset Prism Ap L 1964, HI Rnwy L Sys 1973

HIGH INTENSITY APPROACH RUNWAY LIGHT. A historic term that is at variance with modern terms since it brings together Approach and Runway Lights.

Reference: New High-Intensity AC 1947

HIGH INTENSITY RUNWAY EDGE LIGHT.

Reference: HI Rnwy L Sys 1973

HIGH INTENSITY LIGHTS. Term refers to Edge Lights.

Reference: H I Runway L System 1973, Douglas 1979

HIGH INTENSITY RUNWAY LIGHT. Term refers to Edge Lights.

Reference: ATA 1946, Spec for R & T Edge L 1975

HIRL/MIRL. Acronyms refer to Edge Lights.

Reference: Spec for R & T Edge L 1975

LOW INTENSITY EDGE LIGHTS/LOW INTENSITY RUNWAY EDGE LIGHTING. For IES these Lights employed symmetrical lenses and an intensity of at least 10 candelas.

Reference: IES 1972

LOW INTENSITY RUNWAY LIGHTS (LIRL)/MEDIUM INTENSITY RUNWAY LIGHTS (MIRL)/HIGH INTENSITY RUNWAY LIGHTS (HIRL)/LOW INTENSITY RUNWAY EDGE LIGHTS/MEDIUM INTENSITY RUNWAY EDGE LIGHTS/HIGH INTENSITY RUNWAY LIGHTS. Low intensity units have a light globe of 40 watts maximum. Medium use a maximum of 50 watts. High intensity are at least 210 watts.

References: R & T Edge L Sys 1975 (1st), Spec for R & T Edge Lights 1975

Other versions of Low Intensity Lights include:

LOW INTENSITY LIGHTS.

Reference: ADM 1993

LOW INTENSITY RUNWAY, LANDING STRIP & TAXIWAY LIGHT.

Reference: FAA Ap L Eq 1966

MEDIUM INTENSITY ELEVATED RUNWAY EDGE LIGHT FITTINGS.

Term refers to physical apparatus. Also employed for Elevated Taxiway Lights.

Reference:

MEDIUM INTENSITY LIGHTS. Term refers to stake and base-mounted forms.

Reference: Stand Specs for Constr Arpts 1959, Douglas 1979

MEDIUM INTENSITY LIGHTING SYSTEM. System encompasses Approach and Runway Lights.

Reference: Douglas 1979

MEDIUM INTENSITY TYPE M-1 RUNWAY EDGE LIGHTS/HIGH INTENSITY TYPE M-1 RUNWAY EDGE LIGHTS. USAF physical apparatus designations (L-802 and L-819 are civilian versions).

Reference: Douglas 1979

MEDIUM INTENSITY THRESHOLD SPECIAL LIGHT.

Reference: Spec for R & T L Fix 1975

MEDIUM/LOW-INTENSITY RUNWAY LIGHT. Fixture for smaller airports.

Reference: Momberger 1986

MEDIUM INTENSITY RUNWAY EDGE LIGHT.

Reference: IES 1966, Pollack 1990

RUNWAY EDGE LIGHTS: LIRL, MIRL, HIRL.

Reference: IES 1987

1E2 Taxiway Lighting

a) Overarching Terms

LOW VISIBILITY TAXIWAY LIGHTING SYSTEMS. This is a FAA publications title. It is an overarching term for low visibility Taxiway Centerline Lights, Runway Guard Lights (ICAO: Holding Position Lights), Stop Bars, Clearance Bars. It excludes Taxiway Edge Lights which are of one intensity.
Reference: Low Vis Txwy Light Sys 1998

SYSTEMS OF TAXIWAY LIGHTS. Equivalent of Taxiway Lighting Systems and similar terms.
Reference: FAA ADS-GA 1969

TAXIWAY LEAD-OFF LIGHTS. These Lights indicate route from runway centerline to an exit taxiway. They display Green and Yellow alternating Lights. Term is within In-Runway Lighting category.
Reference: AIM 1999

TAXI LIGHTS. A single reference and one that approaches the historic. It refers to Taxiway Edge Lights and is therefore not an overarching term.
Reference: Airport Receive ... AW 1956

TAXIWAY LIGHT. There are three possible meanings: physical apparatus (equipment), individual unit (physical and morphological), or system (when plural). It is more frequently employed than Taxiway Lighting.
Reference: A & W 1992, Horonjeff 1962, IES 1952, ATA 1946, AD Vol II 1995

TAXIWAY LIGHTING SYSTEM. Term refers to Taxiway Edge Lights.
Reference: Douglas letters, 1977 (Nov. 20 and Dec. 28)

TAXIWAY MARKER LIGHT. Seemingly a synonym for Taxiway Edge Lights displaying lights in Aviation Blue.
Reference: NavAer 1946

TAXIWAY/OBSTRUCTION LIGHTING. Two forms of lights but maintained by one group of personnel in emergency lighting system.
Reference: EALS 1999

TAXIWAY SERIES LIGHTING SYSTEM. A rather dubious term: a number of different Navaid types are batched together ending in “series [and or] lighting system.”

Reference: Hevi Duty ... AI 1994

b) Taxiway Edge Lighting

TAXIWAY EDGE LIGHTS. A fixed light of blue color. It is not employed where Taxiway Centerline lights are used. Term could refer to individual unit or to a system situation.

Reference: IES 1981, Pollack AI 1990, Light Repairs AI 1989, A & H 1979, AD 1999

TAXIWAY EDGE LIGHTING. Presumably a system term. Fixtures are often elevated though some semi-flush units are used.

Reference: IES 1966

TAXIWAY EDGE LIGHTING SYSTEM. Adding system makes the basic term more precise. It indicates the lateral boundaries of the taxing area.

Reference: IES 1987

c) Taxiway Centerline Lighting

CENTER-LINE LIGHTING. Horonjeff here refers to Taxiway Centerline Lighting. The term taxiway drops away because the term is within the context of Taxiway Lighting.

Reference: Horonjeff 1962

CENTERLINE GUIDANCE SYSTEM. Term has the meaning of Taxiway Centerline Lights.

Reference: Horonjeff 1962

TAXIWAY CENTERLINE LIGHTS. The equivalent of Taxiway Centerline Lighting. AIP notes they are employed in low visibility conditions. FAA notes they are divided into straight and curve forms.

Reference: AIP 1999

TAXIWAY CENTERLINE LIGHTING SYSTEMS. This FAA term is employed as a title for publications. Adding system makes the term more explicit in meaning. These lights are uni-directional or bi-directional. They can be in-pavement or flush.

Reference: Clear Reliable ... AI 1989

TAXIWAY CENTRE LIGHTS. "Line" is omitted contrary to most sources. Most likely the specific term refers to individual usage. The same source also includes Taxiway Centreline Lights and simply Centreline.

Reference: Clear Reliable ... AI 1989

TAXIWAY CENTRELINE LIGHTS. Term is either an individual unit and/or a group of integrated lights serving as a system. The specific reference focusses on individual usage.

Reference: Latest Development ... AI 1991

TAXIWAY CENTRE LINE LIGHTS. This version with the key "word" as two words is from ICAO. British English is employed. It is viewed as an individual term here.

Reference: AD 1999, Pollock AI 1990, ADM 1993

TAXIWAY CENTRE LINE LIGHT ON AN EXIT TAXIWAY. ICAO distinguishes between Taxiway and Exit Taxiways. The later form is subdivided into rapid taxiway and other taxiways. The lights alternate green and yellow; other Taxiway Centre Line Lights are green only.

Reference: AD 1990

TAXIWAY CENTER LINE LIGHTING ON TAXIWAY/TAXIWAY CENTER LINE LIGHTING ON RAPID EXIT TAXIWAYS/TAXIWAY CENTER LINE LIGHTING ON OTHER EXIT TAXIWAY. Terms refer to spacing of Lighting on various types of taxiways. All display alternating green and yellow lights with green in flashing mode.

Reference: AD 1999

TAXIWAY CENTRELINE LIGHTING. British spelling. Term presumably refers to a system of such lights.
Reference: McKelvey IN 1987

d) Physical Apparatus and Other Terms

1) Physical Apparatus

General Note. This is primarily a listing of physical apparatus. Many sources do not include physical apparatus terms. Many of these references are from FAA and trade literature. Entries are limited.

BIDIRECTIONAL LIGHTS. A two-direction apparatus.
Reference: Txwy Ctr L Sys 1968

BLISTER LIGHTS. Limited information only. Some forms are entirely flush. Semi-flush forms excluded.
Reference: Friedl AF 1986

BUTTON LIGHTS. Not defined other than low-profile.
Reference: Finch 1961

EDGE LIGHTS. A seemingly overarching term. However, specific reference is in context of Taxiway Lights.
Reference: Txwy Ctr L Sys 1968

ELEVATED TAXIWAY LIGHTS FOR HOLDING POSITION MARKINGS.
This term also includes Holding Position Light and Holding Position Edge Light.
Reference: Spec for R & T L Fix 1998

45w TAXIWAY EDGE LAMPS. Term is in context of new developments in Airport Lighting.
Reference: Momberger AF 1986

FULLY-FLUSH LIGHTING FIXTURE/FULLY FLUSH FIXTURE. Friedl employs Fully-Flush instead of the more common Flush.
Reference: Friedl AF 1986

HOLDING POSITION EDGE LIGHTS. Older name for Runway Guard Light.
Reference: Spec for R & T L Fix 1984

IN-PAVEMENT TAXIWAY LIGHT/LIGHTS, TAXIWAY, IN PAVEMENT.
References: Spec for Seq Fl Airp L 1975, Airp L Eq Cert 1994, 1995

INSET-TYPE RUNWAY & TAXIWAY LIGHTS.
Reference: Momberger AF 1986

LIGHT ASSEMBLY, AIRPORT TAXIWAY CENTERLINE.
Reference: Ap L Eq 1968

LOW INTENSITY TAXIWAY LIGHT (LITL)/LOW INTENSITY TAXIWAY EDGE LIGHT.
References: Spec for L-849 Fl L CD Type Fl L, Spec for R & T Edge L 1975

MEDIUM INTENSITY LIGHT (MIRL)/MEDIUM INTENSITY EDGE LIGHT.
Reference Spec for R & T Edge L 1995

MEDIUM-INTENSITY LIGHT/HIGH INTENSITY LIGHT. Physical apparatus with two-part light mechanism.
Reference: Friedl AF 1986

MEDIUM-INTENSITY, OMNIDIRECTIONAL ELEVATED LIGHT. Context is that of Taxiway Edge Lights.
Reference: Momberger AF 1986

SEMI-FLUSH FIXTURES.
Reference: Friedl AF 1986

SEMIFLUSH INSET LIGHTS.

Reference: Txwy Ctr L Syst 1968

TAXIWAY INPAVEMENT LIGHT/TAXIWAY IN-PAVEMENT LIGHT. Sub-overarching term for Taxiway Light fixtures.

References: Spec for R & T L Fix, 1984, 1998

UNIDIRECTIONAL, BIDIRECTIONAL, LIGHT ASSEMBLY AIRPORT TAXIWAY CENTERLINE. This term includes gasket, lamp, optical assembly and basic receptacle.

Reference: Spec L-852, Light As Airp Txwy Ctrl 1971

2) Other Terms

AIRCRAFT ARRESTING MARKER LIGHT. Term refers to Lights that illuminate Aircraft Arresting Markers.

Reference: EALS 1999

AUTOMATIC BLOCK SIGNAL CONTROL SYSTEM. A form of taxiway control; it suggests an analogy with Railroad Block Signals in sorting yards.

Reference: Warskow 1950

BARRETTE. At least three aeronautical ground lights closely positioned in a transverse arrangement. It gives appearance of a bar of light at a distance.

Reference: Lexicon 1985

CLEARANCE BARS. Term denotes plane approaching hold point or intersecting taxiway. Series of steady burning yellow lights. ICAO notes limits indicate limits but “stop-and-go” signals not required (stop bar).

Reference: AD 1990

CLEARANCE BAR LIGHTS. Variant form that is more complete. Function is to denote holding positions in poor visibility.

Reference: AIM 1999

ENTRANCE-EXIT LIGHTS. Denotes intersection of runway with Taxing Lights.

Lights.

Reference: NavAer 1946

RUNWAY GUARD LIGHT. Found at Taxiway/Runway Intersections. Flashing yellow instead of steady burning Clearance Bars known as Hold Bars.

References: AIM 1999, Txwy Ctr L Sys 1968, 1969

SNOW AREA LIGHTS (ELEVATED LIGHTS). Term refers to Taxiway Lights well above ground. Such Lights are also appropriate where there is high grass, maintenance problems. Lights are contrasted to Semi-flush Lights.

Reference: NavAer 1946

STOP-AND-GO SIGNALS. A component of Automatic Block Signal Control System which see.

Reference: Warskow 1950

STOP BARS/STOP BAR SYSTEM. A stop signal controls access to runways. ICAO found at taxi-holding position.

Reference: ICAO 1990, Low Vis Txwy L Sys 1998

STOP BAR LIGHT/STOP-BAR LIGHT. Term indicates when ATC has approved aircraft to enter/cross runway. Displays rows of lights (red, uni-directional, steady-burning, inset). When -- and if Lead-in Lights are in operation -- then approval has been gained. Hyphenated form is contributed by Momberger.

References: AIP 1999, Momberger 1986

TAXIWAY GUIDANCE LIGHTS. These are Taxiway Edge Lights under an older name.

Reference: IES 1952

TAXI-HOLDING POSITION LIGHTS. Apparently this is ICAO's name for Runway Guard Lights. It displays alternating yellow lights.

Reference: AD 1990, Clear ... AI 1991

TAXIWAY INTERSECTION LIGHT. These Lights display omnidirectional

yellow lights.

Reference: IES 1981

TAXIWAY TRAFFIC CONTROL SYSTEM. Term in this instance refers to Taxiway Signals= Traffic Signals. They control vehicular traffic on taxiways.

Reference:

1E3 Historic & Composite Terms

a) Historic Terms: Boundary, Contact & Range Lights

BOUNDARY LIGHTS. An early form of Navaid. They predate Edge and other Lights. As the name indicates they formed a boundary around the landing area. They were frequently steady-burning and white in color (in US but often red in other countries). Some sources note that green lights were included for denoting direction for landing. That form appears to correspond to Range Lights which see. Boundary Lights may have also included red lights indicating hazards. Most references in the literature are for the years 1926-1952; few references after 1952. References: Caldwell 1930, Black 1929, Duke 1927, Glidden 1946, Wood 1940, Norvell AC 1941

BOUNDARY LIGHT SYSTEM. An integrated arrangement of Boundary Lights. The previous term, Boundary Lights, is a system term though implicit. References: Norvell AC 1941, Wood 1940, Glidden 1946

CONTACT LIGHTS. This is a forerunner of Edge Lights. Norvell notes that intensely used airports (Class III) displayed floodlights or contact lights. They were positioned on both sides of the runway. References: Norvell AC 1941, Douglas 1978

CONTACT-LIGHT SYSTEM/CONTACT LIGHT SYSTEM. Term probably has meaning of Contact Lights but adds System to basic term. References: Haber 1958, Douglas 1979

DISTANCE-TO-GO (DTG) MARKER LIGHTS/-LIGHTING. Term refers to

DISTANCE-TO-GO (DTG) MARKER LIGHTS/-LIGHTING. Term refers to DTG Markers illuminated by flood lamps.

Reference: EALS 1999

FLASH MARKER LIGHT. Located at edge or near edge of paved runways. It assists crew "to properly contact the runway." It can display split filters of Clear/Amber which warn of approach end of runway.

Reference: Glidden 1946.

FLOATING SEADROME LIGHT. Term is equivalent of Runway Edge Light. A 1930/1940s term.

Reference: Breckenridge 1955

LAND & HOLD SHORT LIGHTS (LAHSO). This is an air traffic control process. It is designed to increase capacity without reducing safety. The Lights indicate the "hold short point". This allows landing and short term holding. Messages are in the form of pulsing white Lights positioned across the hold short point.

Reference: AIM 1999, AOPA

RANGE LIGHTS. These Lights are included in Boundary Lights. According to some sources Range Lights varied in number according to importance of the airport. Some airports displayed two lights at ends of landing, while others had three or even four lights. Fewer sources include Range Lights.

References: Glidden 1946, Norvell AC 1941, Wood 1940, CD 1978

b) Composite Terms

General Note. These terms involve two or more types of Runway/Taxiway Lights (and associated forms). The terms may refer to physical apparatus or to integrated systems. Individual components described in appropriate categories.

CENTERLINE & OR TOUCHDOWN ZONE LIGHTS.

Reference: Maint Guide for Det Degr 1971

CENTERLINE & TOUCHDOWN ZONE LIGHTING SYSTEMS.

END/THRESHOLD LIGHT.

Reference: Utility Airports 1975

LIGHTS, RUNWAY & TAXIWAY EDGE, LOW INTENSITY/LIGHTS,
RUNWAY & TAXIWAY EDGE, MEDIUM INTENSITY

Reference: Spec for L-842, Airport Ctr L 1964

RUNWAY CENTER & TDZ LIGHTS/RUNWAY CENTERLINE & TDZ
LIGHTING SYSTEM.

References: Maint Guide for Det Degr 1971, Spec for R & T L Fix 1984, 1998

RUNWAY & STRIP LIGHT

Reference: Med Int Rnwy L Sys 1967, Ap L Eq 1966

RUNWAY & TAXIWAY EDGE LIGHTS.

Reference Vis Apr Sl Ind (VASI) Syst 1976

RUNWAY & TAXIWAY EDGE LIGHTING SYSTEMS.

Reference: Spec for R & T Light Fix 1984, 1998

RUNWAY & TAXIWAY LIGHTS.

Reference: Facility Ops & Adm 1991

RUNWAY THRESHOLD/END LIGHT.

Reference: H I Runway L Sys 1973

THRESHOLD & RUNWAY END LIGHT/THRESHOLD RUNWAY END
LIGHT.

References: R & T Edge L Sys, D & B 1977

TOUCHDOWN & CENTERLINE LIGHT

Reference: AIP 1991

CHAPTER TWO

SIGNS, MARKINGS, MARKERS & MARKS

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Visual Aids

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2B Overarching, Marks, Markers & Miscellaneous Terms

General Notes for Chapter 2B & 2C

General Note I. There is no adequate term covering all of the unlighted Visual Aids. While a few terms are partially adequate none of the terms offer full inclusivity. Specific types of unlighted Visual Aids have a variety of satisfactory terms in contrast to the general body of terms. “Unlighted Visual Aids” may serve as an adequate term though it is seemingly not represented in the literature. Terms including the words Visual Aids often include Lighted Aids. The approximately half-dozen terms in the overarching group are in two groups: Air Markings (and variants), and several terms that include the words Day and Marking.

General Note II. Chapter 2 is a chapter of diverse elements. Adding to the medley of forms is the presence of a lighted dimension for some Aids. Even lighted forms bear a notable resemblance to unlighted forms and remain apart from Airport Lighting. To some degree the use of light represents a substitute for daylight.

2B1 Overarching Terms

AIR MARKINGS. This and similar terms are of an older vintage and generally refer to Roof Markings in the earlier days of aviation. Air Markings include Roof Markings, Hanger Roof Markings, Town Markers, even Landscape Markers and Highway Markers. They are frequently illuminated.

References: Blee 1929, Black 1929, Glidden 1946

AIRMARKING. A variant form that uses the conjoined term as a single word. The letters for this form were of chrome yellow on a dull black ground. They were floodlighted at night.

Reference: Airmarking AC 1927

AIRPORT MARKING AIDS. For AIP this term includes Airport Signs and Markings. It is not clear how inclusive this term is. Do Signs include lighted forms? Markings presumably are pavement forms. Are Elevated Markers excluded? Obstruction Markings of various types are seemingly in that special

category. Nonetheless, Markings Aids (as opposed to Markings) is a possible overarching term that can be expanded to include other forms.

Reference: AIP 1991

AIRPORT MARKING AIDS & SIGNS. AIP 1999 altered the meaning of Marking Aids and excluded Signs from inclusion. Signs are now conjoined to Marking Aids. Obstruction Markings are excluded in this version.

Reference: AIP 1999

AIRPORT PAVEMENT MARKINGS & SIGNS. A variant form of Airport Marking Aids & Signs that adjoins previous term.

Reference: AIP 1999

DAY MARKINGS. An overarching term for Breckenridge that includes Cones for Boundary Lights. Blee specifically mentions only cones. AD employs the term as a process of Day Marking more than objects. However, Day Marking Aids has extensive employment for actual Aids.

References: Breckenridge 1955, AD 1951, Blee 1929

DAY MARKING AIDS. Newer editions of AD seemingly drop day from significant usage. AD 1971 restricts the term to Marking of boundary of landing areas that lack runways. The objects are triangular in shape (3'x10'x6" high). They are orange in color or orange/white or red/white. AD 1951 uses the term as an overarching term for many forms of Runway Markings. It is also attached to Obstacle Markings.

Reference: AD 1951, 1971

DAY MARKING DEVICES. For Breckenridge this term refers to Cone and color pattern of Boundary Lights. For PICA0 it encompasses signs, shapes, flags. Shapes refer to Boundary Markers, Circle Markers, Wind Direction Indicators, Landing Direction Indicators.

Reference: PICA0 1944, Breckenridge 1955

DAYTIME MARKINGS. A term of general appearance though specific reference is to Heliport Markings.

Reference: IES 1972

There are terms of a sub-overarching nature that include two or more categories but not the full range. These include:

MARKING AIDS. The subdivision in Airport, Air Navigation Lighting & Marking Aids (AIM 1973) centers on Runway and Taxiway Markings which includes Pavement Markings only. Despite its broader appearance it is a restricted term.

Reference: AIM 1973

SURFACE MARKINGS & MARKERS. This joint term includes Pavement Markings and Elevated Markers.

Reference: ADM 1983

UNIFORM SYSTEM OF GROUND MARKS. A 1919 term that lacks specificity. Limited lighted forms that might be included. The original French term, “Reperes Aeronautiques” can be translated as Aeronautical Marks.

Reference: Convention 1919

There are terms that include unlighted Aids but also include lighted forms and therefore are more relevant to the concerns of Chapter 1. They constitute a cross-reference here with the primary entries in the previous chapter.

AID, Phak 1971, Clark 1993

AIRPORT VISUAL AIDS, AIM 1999

GROUND AIDS, PICAQ 1944

VISUAL AIDS, Stol Port 1970

VISUAL GROUND AIDS, ADM 1983

VISUAL-AIDS SYSTEM/VISUAL AIDS SYSTEM, McKelvey 1987, FR Arcata 1949

AIRPORT MARKING & LIGHTING, ADS-TA 1983, Whittenberg 1964

AIR NAVIGATION LIGHTING & MARKING AIDS, Phak 1971

LIGHTING/MARKING, ADS-AC 1971

LIGHTING & MARKING, ADS-AC 1971, Alaska 1984

LIGHTING & MARKING SYSTEM, Finch 1938, Alaska 1984
MARKING & LIGHTING, Stolport 1970, ADS-TA 1983

2B2 Marks & Markers

General Note. Terms are divided into physical forms or morphological terms. References to the physical/morphological dimension may have begun with the first edition of *T-M Database: Marine* (1997) but little has been written in the monographs on these dimensions and what they mean. A third edition of the *General Classification* may provide a forum for a discussion of the idea. Many Marker terms emphasize one or the other dimension. Morphological terms include the function of the entity and possibly refer to the physical dimension. Physical terms focus on physical apparatus but may have some reference to the morphological. Terms often occupy a spectrum between fully morphological or fully physical. Gradations range from substantially one dimension to a moderate or mild tending toward one dimension and some terms include a second dimension only slightly.

a) Overarching & Physical Marker Forms

MARKS. A term of limited use. It can be a singular form of Marking. It can also be combined with other words (e.g., Air-Mark).

Classification: Mark is a basic term of Transportation-Markings. However it does not appear in the classification to date. It needs to be added though the forms of Marks are few in number for Aero Aids.

Reference: Whitnah 1966, Marking of Deceptive ... 1963

MARKERS. This is overwhelmingly the core term for this form of Aid, However, it is only infrequently employed as an overarching term. Most uses are in the nature of a short form of a longer specific term. For example, Boundary Marker are often termed simply Marker in descriptions of Boundary Markers. ICAO, however, employs Marker as an overarching term. Newer editions of *Aerodromes* include a variety of types of Aids under the general term. There are other sources that use Marker in a general sense though there may be few specific forms under the general term so that Marker and specific form are nearly synonymous.

References: ICAO AD (many editions), Heliport Design (several editions), IES 1981, 1972, 1987, OML (several editions), NATO, Potts U 1999

General Note: Classification: No general category in classification for Markers. The classification has two headings: Elevated Markers, and Low-Elevation Markers.

Classification #: 337 (Elevated), 338 (Low-Elevation)

Form of Device: Unlighted TCD Aid

Operation: Markers are either elevated or surface forms. They either augment painted Markings or provide independent delineation.

Comments: See General Note

ABOVE GROUND MARKER. Term may tend toward physical though a morphological term is present. Forms includes half drums, vee boards, flower-beds, low hedges, painted rocks, low board fences. It refers specifically to “outer edge of peripheral turfed touchdown pad.”

References: HD 1977, 1988

BIDIRECTIONAL REFLECTIVE MARKERS. This form marks centerlines for runways and taxiway. Color combinations include clear, red/clear, green, yellow/clear, red. Color meaning reflects those of Lights. The term is largely physical but the content becomes morphological.

Reference: FAA Spec L-853 R & T RR Mkrs 1971

CONE MARKERS. Cones are often employed as Markers. The addition of Cone to the name Marker is infrequent. This usage is from Australia.

Reference: Supplement 1971

CYLINDRICAL MARKER. Term refers to Elevated Marker for Runway & Taxiway Edge Marking.

Reference: FAA R & T RR Markers 1980

CYLINDRICAL RAISED MARKERS. Term has specific references to edges (outer) of hover taxi route safety area for Vertiports.

Reference: Vertiports 1991

ELEVATED MARKER. This represents one form of Runway and Taxiway Retroreflective Markers. There are two types: cylindrical, 360 degrees, and one with displaying flat surfaces.

References: FAA Spec L-853 R & T RR Mkrs 1971, Memo-Airp Light Equip 1992

FLUSH-TYPE MARKERS. Term refers to Markers at turfed heliports. Term can have more general meaning but the specific reference is to one usage. Markers include white stones, concrete slabs which are located at touchdown pad edges.

References: HD 1977

LIMED MARKER. Term refers to Heliport Marking symbol for turfed heliports. Standard symbol created with limed on natural surface. Morphological and physical both present. Physical slightly stronger? By term but not by use.

Reference: HD 1977

“MANMADE” MARKERS. An actual term? More descriptive of the nature of Marking than a formal term. Refers specifically to Markers at turfed heliports.

Reference: HD 1977

MARKER, RETROREFLECTIVE. Approved Lighting Equipment provides a form that begins with the general term before qualifying it. The 1978 edition adds subdivisions of On-Pavement Reflector and Elevated Reflector.

References: Ap L Eq 1976, 1978, 1994, 1995, 1998

NATURAL ABOVE GROUND MARKERS. These Markers are for heliports. Forms include low hedges, flower beds. Cp Above Ground Markers which are artificial forms. Both physical and morphological elements are in the title.

Reference: HD 1994

NON-SNOWPLOWABLE MARKERS. This form is not designed to survive encounters with snowplows. See also Snowplowable Markers.

Reference: FAA Spec L-853 R & T Ctr Mkrs 1971

PLANE MARKER. A form of Elevated Marker with plane (flat) surfaces.
References: FAA Spec L-853 R & T RR Mkr 1980

RBI MARKERS/RBI RETROREFLECTIVE MARKERS. RBI=Reginald Bennet Intl. Initials of maker attached to form. Refers to new form described by Potts.
Reference: Potts IJ 1999

REFLECTING MARKER. An alternating name for Retroreflective Markers.
Reference: Potts IJ 1999

REFLECTIVE DISTANCE MARKERS. This term appears to include Signs and Markers (or uses Signs and Markers interchangeably). It includes numerical symbols.
Reference: VI

REFLECTIVE MARKER. A variant name for Retroreflective Markers.
Reference: FAA Spec L-853 R & T RR Mrks 1969, VI, Installation Details 1968

REFLECTORIZED MARKERS. Term refers to Elevated Marker consisting of cylindrical Marker on pole. The yellow message for "ground guidance on taxiway" indicates a morphological dimension.
Reference: Ulmer

RUNWAY & TAXIWAY REFLECTIVE MARKERS/RUNWAY & TAXIWAY RETRO REFLECTIVE MARKERS. These overarching terms are from FAA Approved Lighting Lists. They refer to pertinent literature in the field but provide no details. The second term, from 1973, includes subdivision of On-Pavement Reflectors and Elevated Reflectors.
References: Ap L Eq 1971, 1973

RETROFLECTIVE AIRPORT MARKERS. A somewhat general term referring to Elevated Markers for multiple purposes.
Reference: VI

RETROREFLECTIVE MARKERS. A general term for Markers employing

various kinds of reflective materials. Seemingly both low-elevation and elevated forms are included. Employed for edge and centerline functions.
References: VI, Installation Detail 1969, FAA Spec L-853 Ctrl R & T RR Markers 1969, Txwy Ctr L Sys 1968

RETROREFLECTIVE PAVEMENT MARKERS. Terms refers to project testing Markers to determine effectiveness in specified conditions. Term has overarching possibilities but seemingly rare in the literature.
Reference: Brown FAA 1983

RETRO-REFLECTIVE MARKINGS/RETRO-REFLECTIVE AERODROME MARKINGS. This term present an appearance of an overarching term. However, it instead refers to the use of glass beads in Painted Markings.
Reference: ADM 1983

TYPE I-VI MARKERS

General Note. Older FAA sources classified a variety of Markers as Types and Styles. This coverage brings together those various forms.

Specific Name: BIDIRECTIONAL REFLECTIVE MARKERS

Shorter Name: REFLECTIVE MARKER/Short Name: MARKER

Purpose: Delineate Centerlines (Airport Runways, Taxiways, Apron Surfaces)

Type I Bidirectional Clear

II Bidirectional Red-Clear

III Bidirectional Green

IV Bidirectional Yellow-Clear

V Bidirectional Red

VI Unidirectional Clear

References: Spec L-853 R & T 1969, 1970

Style A-D Markers: "A" 360 degrees White Retroreflective Cylindrical 12' H

"B" Green

"C" Red

"D" Yellow

Reference: Spec L-853 R & T Retroreflective Marker 1971

UNIDIRECTIONAL L-853 TYPE IV MARKERS. A components of above Aids. First compilation was in outline form. This source includes one of those components in a full word and number format.
Reference: Installation Details 1969

b) Morphological Marker Forms

AIMING MARKER FOR TURBOJET OPERATIONS. This Marker is described as a Marking and it conforms to that form. It is a Surface/Pavement Marking. It displays three stripes on each side of the runway centerline.
Reference: Marking of Serviceability R & T, 1966

AIR-MARK. This may appear to be a major term. Yet only a single surveyed source includes it. Seemingly it serves as a verb not a noun. The term refers to Roof Signs. The terms Markings and Airway Signs are also employed. Lighting is present. The Signs are chrome-yellow on black.
Reference: Young 1928

AIR MARKER/AIR-MARKER/AIRMARKER. Terms include various Aids with a focus on displaying the names of towns to aviators. Most were Roof Signs. Color scheme included black and orange. They were used to identify locality, indicate north bearing, give distance/direction to nearby airport. Features included name of town, latitude/longitude, arrow. The terms may give an appearance of general use but they were often of a very specific function.
References: Glidden, CAA 1948, Air Markers, Time 1936, Airmarking AC 6-48

AIR TAXIWAY MARKER. Edge Marker for heliport operations.
Reference: Suppl. 1971, 1991-Vol II

AIRCRAFT ARRESTING MARKERS. These Markers are in a Sign form. They are diamond-shaped and illuminated.
Reference: EALS 1970

APPROACH DAY MARKER. Term refers to three-dimensional objects which give greater contrast to background than flat Markers affixed to ground. These Markers are the components of the Approach Day Marking System. See Also: Day Markers.

Reference: AD 1958

APPROACH DAY MARKING SYSTEM. A system consisting of Elevated Markers. Components listed as Markers not Markings.

Reference AD 1958

BARRIER ENGAGEMENT MARKERS/HOOK CABLE MARKERS. These terms refer to Markers that indicate location of arresting gear. They display an orange circle on black ground. Possibly similar to Aircraft Arresting Marker.

References: IES 1981, 1987

BOUNDARY MARKERS. For PICA0 these Markers denote boundaries of landing areas. For AD 1990 they perform the same function for landing areas that lack runways. There are two forms: a conical type and a triangular-shaped object.

References: PICA0 1944, AD 1990, Supplement 1961, 1991

CENTERLINE MARKER. Term is short form of Runway Centerline Markers & Taxiway Centerline Markers. Similar terms include Reflective Markers, Markers, and terms with color attached. Term refers to retroreflective Markers of a "low profile" design which is affixed to pavement. See also Type I-VI Markers.

References: FAA Spec L-853 R & T RR Markers 1971, Installation Details 1969

CIRCLE MARKER. Two sources include this Aid. Is this similar to Marker Circle? Details are lacking

Reference: Whitnah 1966, PICA0 1944

CORNER MARKER. Seemingly a term for both In-Ground Markers and also Ground Markers at corners of heliport pad.

Reference: HD 1988

DAY MARKER. A general-appearing term. However, it is a specific reference to

Approach Day Marking which is comprised of Markers. The Markers are three-dimensional objects which are preferable to flat forms on the ground. See also: Approach Day Marking System, Approach Day Marker, System of Approach Day Markers.

Reference: AD 1951

DAY MARKERS FOR SNOW-COVERED RUNWAYS. Denotes bounds of runways covered with snow. Such Markers need to be clearly visible. Spruce trees and tripods are two forms of this type of Marker.

Reference: AD 1971

DISTANCE MARKER. Shorter name for Runway Distance Marker. It is described as a “numbered sign” that gives distance to runway end.

Reference: NavFacEngCom AF 1981

DISTANCE-TO-GO MARKERS/DISTANCE TO GO MARKERS. Seemingly a more explicit name for Distance Marker in Sign form. The first version is internally lighted with a number; it is also termed a Sign.

Reference: Cegelec (1st), VI (2nd)

EDGE MARKER/EDGEMARKER. Markers of an elevated design Panels are attached to legs. Pollock offers a conjoined form.

References: Utility Airports 1975, Vertiports 1971, Pollock AI 1990

EDGE MARKERS FOR SNOW-COVERED RUNWAY. These are visible objects employed as Markers. They can be evergreen trees or “light-weight markers.” See also Marking for snow-covered runways.

Reference: AD 1990

ELEVATED TAXIWAY EDGE MARKERS. Term includes the specific function of the Marker in the title. See also: Elevated Marker.

Reference: VI

FATO EDGE MARKER. Equivalent to In-Ground FATO Corner/Edge Markings.

Reference: HD 1994

1500-FT MARKER/RUNWAY 1500-FT MARKER. This consists of Stripes marking distance from end of runway. Is it designated Marker because there are no alphanumeric symbols?

Reference: PICA0 1944

FIXED DISTANCE MARKER. This Aid consists of a block (wide band) of black paint applied to runway for turbojet aircraft landing. There are also other stripe and band forms termed Markers. Alphanumeric forms and lines are not so designated.

Reference: AIM 1973, 1991

FLAG MARKER. This is an Obstruction Marking. Flags replace Spherical Markers in some circumstances. Flags can display solid, triangular or checkerboard patterns. Solids display orange; Triangulars and checkerboards have orange and white patterns.

References: OML 1973, IES 1981

HALF WAY MARKERS. Term included in trade literature. Term may come from maker, or may be an informal descriptive term. Few details available.

Reference: VI

HELICOPTER APPROACH MARKERS. One source supplies term. Term refers to a new form of Retroreflective Marker. How does it correlate with similar ICAO and FAA terms?

Reference: Potts IJ 1999

HOLD LINE MARKERS. Maker's descriptive term for Holding Position Markers/Markings.

Reference: VI

IDENTIFICATION MARKERS. General term for Markers that can replace lights at heliports and small airports. Made of new form of retroreflective material designed to "bounce" most reflective light back to source.

Reference: Potts IJ 1999

ILLUMINATED DAY AND NIGHT MARKER. One type of Air Marker which displays town name, latitude and longitude. Source describes two forms: "Crushed stone or concrete marker;" "baked enamel or porcelain raised marker." Reference: Glidden 1946

IN-GROUND CORNER MARKER. A flush Marker delineating corners of turf FATO. Shorter form is In-Ground Marker. It may also include side locations. Reference: HD 1988

IN-GROUND MARKERS. This form "... provid[ed] color and textural differences on the natural surface, [and was] ... used to mark turfed surfaces." A physical dimension is present but term associated with terms that are clearly morphological. The term has a physical dimension as well. Reference: HD 1988

IN-GROUND EDGE MARKERS/IN-GROUND MARKERS. For Vertiports these terms seem to refer to Edge Markers in the ground. The second term may be at variance with meaning of In-Ground Marker. Reference: Vertiports 1971

LANDSCAPE MARKER. This is a form of Air Marker that is found at parks, along highways. See also Air Marker. There may be a physical dimension but the morphological seems more prominent. Reference: Glidden 1946

MARKERS & MARKINGS FOR SNOW-COVERED RUNWAYS. These are very visible objects (e.g., spruce trees that are ca. 5' high or wooden tripods). They denote limits (usable) of snow-covered runways. Reference: Mrkng of Service R & T 1966

MARKER CIRCLE. Aid indicates location of landing areas. It consists of a circle (100' in diameter and a band 4' wide) and displays a white design on a chrome-yellow ground. Cp Segmented Circle. Reference: Black 1929

RUNWAY DISTANCE MARKER. This Marker indicates meters remaining for landing takeoff. Is it a Marker because of a display of numbers not words? Marker serves as short name for it. It has also been described as a Sign. It is a lighted form.

Reference: IES 1972, 1981, 1987

VERTICAL RUNWAY DISTANCE MARKER. Marker is within illuminated Runway Distance Markers group. It is also listed as a Sign.

Reference: NATO 1992

PAINTED HIGHWAY MARKER. A type of Air Marker which see. Tends toward morphology.

Reference: Glidden 1946

POWER LINE OBSTRUCTION MARKER. Term refers to spheres in international orange.

Reference: Manairco

RAISED EDGE MARKER. Specific forms at Vertiports. Employed for marking taxi routes. Includes In-Ground Edge Markers.

Reference: Vertiport 1991

RETROREFLECTIVE RUNWAY & IDENTIFICATION MARKERS. Specific reference is to a new form of Retroreflective Marker though term can suggest more general coverage. Term is also physical.

Reference: Potts IJ 1999

ROOF TOWN MARKER. A type of Air Marker which see.

Reference: Glidden 1946

RUNWAY MARKERS. This term suggests the appearance of a general term. Specific reference is to Tritium wands (illuminated) in Alaska. Tends toward the physical but "Runway" places it in morphology.

Reference: Alaska 1984

RUNWAY TOUCHDOWN ZONE MARKER. It consists of groups of rectangular bars on pavement. Marker and Marking apparently interchangeable here.

Reference: AIM 1999

SAFE HEADING MARKER BOARD. This term is within category of Illuminated Taxiway Guidance Signs. Few details given.

Reference: NATO 1992

SEGMENTED CIRCLE MARKER. Seemingly the equivalent of Segmented Circle Marker System.

Reference: Segmented Markers AW 1947

SEGMENTED CIRCLE MARKER SYSTEM. This system of Airport Marking contains various aids for pilots and also Traffic Control Devices. The components include:

SEGMENTED CIRCLE. An Aid for finding obscure airports. The circle is the central location for various "indicators and signal devices":

INDICATORS. These include: Wind Direction Indicator, Wind Cone, Landing Direction Indicator, Landing Strip Indicator, Traffic Pattern Indicator, Right-Turn Indicator.

CLOSED FIELD SIGNAL. Panels positioned in a cross form Indicating permanent closure.

SYSTEM OF AIRPORT MARKING. Refers to a system containing pilot aids and traffic control devices.

Reference: Seg Cir Apt Mrkngs Sys 1963, 1984

SEGMENTED MARKERS. Seemingly a shorter name for Segmented Circle Marker.

Reference: Segmented Markers 1947

SEMIFLUSH MARKER/SEMIFLUSH MARKER FOR CENTERLINE MARKING/SEMIFLUSH RETROREFLECTIVE MARKER. Seemingly all three terms refer to same Marker. They are one form of R & T Retroreflective Markers.

They are employed for Centerline Marking.
Reference: FAA Spec L-853 RR R & T 1980

SNOWFLOWABLE MARKER. A semi-flush Marker for Centerline Marking that can withstand contact with a snowplow.
Reference: FAA Spec L-853 RR R & T Marker 1980

SPHERICAL MARKERS. They are placed on overhead wires and is in aviation orange. The term is found in Obstruction Markings. It is also listed here because it is of the Marker form.
References: OML 1971, 1991, IES 1981

STANDARD AIR MARKER. The term may give a general appearance but it has a specific focus. The category of seaplane base contains this single Aid. Anchor symbol painted on roofs and other areas. Numerals, other symbols can be employed. The word Marking can be interchanged with Marker. Marker is shorthand for the full term.
Reference: Seaplane Bases 1994

STANDARD BOUNDARY MARKER. This refers to Cones and Cone Markers in Australia.
Reference: Suppl 1971, 5th ed 1969

STANDARD MARKER. Term appears to have general meaning but instead has a specific meaning: Segmented Circle Marker which see.
Reference: Segmented AW 1947

STOPWAY EDGE MARKERS. Marker employed where stopway boundaries are not clear. It consists of small vertical boards. See also Stopway Edge Markers.
Reference: AD 1990

STOPWAY DAY MARKERS. Aid consists of vertical boards. It can possibly be confused with Runway Edge Markers. Details are limited. See also Stopway Edge Markers.
Reference: AD 1971

SUPPLEMENTAL REFLECTIVE MARKERS/SUPPLEMENTARY MARKERS. These are Reflective Markers for Taxiway Edges which supplement Taxiway Centerline Lighting. The meaning is the same for both terms.
Reference: Txwy Ctr L Sys 1968

SYSTEM OF APPROACH DAY MARKERS. Alternate name for Approach Day Marking System which see.
Reference: Suppl. 1961

TAXIWAY CENTRE LINE MARKERS/TAXIWAY CENTERLINE MARKERS. These are Reflective Markers in green. Employed for several functions including absence of Centerline Lights or Edge Lights. Also used when Edge Markers are omitted.
Reference: AD 1990, Instal Det for Maint Stand 1969

TAXIWAY EDGE MARKER. These Markers are of a retroreflective nature. They are blue in color and of a frangible form. Employed on Code 1 or Code 2 Taxiways. Lights and Taxiway Centerline Markers are not employed.
References: AD 1990, ADM 1983

TAXIWAY ENDING MARKER. Marker is of a retroreflective nature and frangible. Listed as Marker because of lack of an alphanumeric component? FAA seemingly does not view it as a Sign. Diagonal yellow stripes on black ground encompass the physical structure and therefore not listed as a Sign. Though Spec for R & T places the words Unlighted Signs in () after the name. FAA refers to entities that include discrete graphic symbols that do not encompass the structure as Signs.
Reference: Stand for Airp Signs Sys 1991, 2004, FAA Spec L-853 for RR R & T, 2004

TAXIWAY HOLDING POSTS/TAXIWAY HOLDING POST MARKER. Painted surface Markings; indicates places where aircraft may be held in traffic control.
Reference: PICA0 1944

TAXIWAY ROUTE EDGE MARKER. This is an Elevated Marker. It displays bands of yellow-blue-yellow.
Reference: HD 1994

THRESHOLD MARKER. Term included in publication but only to indicate such an Aid is not included in said publication other than the title.
Reference: Instal Det for Maint Stand 1969

UNSERVICEABILITY BOARDS. This Aid denotes areas that can be used for aircraft movements. Types of objects include Flags, Cones, Marker Boards Lights. The word unserviceability is added to each of those words.
UNSERVICEABILITY CONES
UNSERVICEABILITY FLAGS
UNSERVICEABILITY MARKER BOARDS
Reference: AD 1990

UNPAVED RUNWAY EDGE MARKERS. Marker is of two forms: flat surfaces or conical. They mark the limits of the runway. When feasible the Markers can be attached to the structure of Lights.
Reference: AD 1990

UNPAVED TAXIWAY EDGE MARKERS. This Marker is employed where limits of taxiway not clear. It has a conical shape. It can be affixed to structure of Light when feasible.
Reference: AD 1990

UNSERVICEABILITY MARKERS. Markers denote areas that can be safely bypassed though they are to be used by aircraft. They can take the form of Flags, Cones, Marker Boards, also Lights.
Reference: AD 1990

VOR CHECK-POINT MARKERS. A somewhat confused terminology exists with this term. AD 1990 and 1999 refers to it as a Marking. AD 1969 lists it as Marker though the Aid is made up of Sign and Pavement Marking.

References: ICAO AD 1969, 1990, 1999

2B3 Other Forms

General Notes. Some reflectorized elements are attached to terminology for various Signs, Markings, Markers. Yet other reflective elements are stand-alone units. It becomes a question where such Aids should be placed. IES refers to some of those elements as supplements to Lights and Markings. For that reason free-standing reflective aids are placed in this separate category since they may not be integral to established forms of Aids. A second segment provides cross-references for elements elsewhere in which reflective words are attached to basic terms.

a) Reflective Aids

CENTERLINE REFLECTORS. This term is a short form of Taxiway Centerline Reflectors. They supplement Lights and Markings.

Reference: IES 1981

EDGE REFLECTORS. IES includes these Reflectors under other names as well. They include Elevated Edge Reflectors and Taxiway Edge Reflectors. The reflectors are cylindrical in shape, blue in color and cover 360 degrees.

Reference: IES 1987

ELEVATED EDGE REFLECTOR. Term is interchangeable with Taxiway Edge Reflectors.

Reference: IES 1981

ELEVATED REFLECTORS. Term is a subdivision of Marker, Retroreflective which see.

References: Ap L Eq 1973, 1976

ELEVATED TAXIWAY EDGE REFLECTOR. Variant form of basic term of Taxiway Edge Reflector.

Reference: IES 1987

ON-PAVEMENT REFLECTORS. A subdivision of Markers, Retroreflective which see.

References: Ap L Eq 1973, 1976

“PASSIVE LIGHTING”

General Note: Potts in IJ describes a new form of material for reflective Markings: Passive Lighting. The material in effect consists of many tiny reflecting units that can “bounce” back nearly all light shown upon the material. Potts employs many terms some of which are duplicate terms in the literature or at least overlap. Other terms may be exclusive with him. The following terms are from that source and incorporate the new form of reflective material. All of these terms are linked by that material. RBI Markers bear the name of the maker: Reginald Bennett International (RBI).

HELICOPTER APPROACH MARKERS

HELICOPTER MARKERS

IDENTIFICATION MARKERS

RBI REFLECTORS

RETROREFLECTIVE AIDS

RETROREFLECTIVE IDENTIFICATION MARKERS

RETROREFLECTIVE MARKERS

RETROREFLECTIVE RUNWAY & IDENTIFICATION MARKERS

RUNWAY REFLECTORS

REFLECTOR, TAXIWAY, STRIP & RUNWAY. A term from Military Specs.

Reference: Txwy Ctrl L Sys 1968

REFLECTORS. An overarching term. However, specific reference is to Reflectors as one part of Taxiway Guidance Systems.

Reference: IES 1981, 1987

RETROREFLECTIVES. This term refers to Runway s & Taxiway Markers; also Taxiway Edge Markers.

Reference: IES 1972

RUNWAY CENTERLINE REFLECTORS. These Reflectors serve as a supplement to Centerline Lights, Painted Markings. They are bidirectional in white or red/white and are 5/8" high.

Reference: IES 1981

RUNWAY/TAXIWAY REFLECTORS. Term refers to Retroreflective Pavement Markers.

Reference: Brown 1983

TAXIWAY CENTERLINE REFLECTOR. These Reflectors supplement Lights and Painted Markings. They are bidirectional, green, 5/8" high (15.9 mm).

Reference: IES 1981, 1987

TAXIWAY EDGE REFLECTOR. These are elevated in blue and cover 360 degrees. They are a supplement to Taxiway Edge Lights.

Reference: IES 1981, 1987

b) Cross References: Reflective Terms Combined with Regular Aids Terms

BIDIRECTIONAL REFLECTIVE MARKER. FAA Spec L-853 RR R & T 1969, 1970

MARKERS, RETROREFLECTIVE. Reference: Ap L Eq 1994, 1995, 1998

RBI RETROREFLECTIVE MARKERS. Reference: Potts IJ 1999

REFLECTIVE DISTANCE MARKER. Reference: VI

REFLECTIVE MARKER. Reference: VI, FAA Spec L-853 RR R & T 1969, 1970

REFLECTORIZED MARKERS. Reference: Ulmer

RETROREFLECTIVE AIRPORT MARKER. Reference: VI

RETROREFLECTIVE MARKERS. Reference: CL L Syst 1968

RETROREFLECTIVE PAVEMENT MARKERS. Reference: FAA 1983

RETRO-REFLECTIVE MARKINGS/RETRO-REFLECTIVE AERODROME MARKINGS. Reference: ADM 1983

RETROREFLECTIVE IDENTIFICATION MARKER. Reference: Potts IJ 1999

RUNWAY & TAXIWAY REFLECTIVE MARKERS/RUNWAY & TAXIWAY RETRO REFLECTIVE MARKERS. References: Ap L Eq 1971, 1973

SEMIFLUSH RETROREFLECTIVE MARKER. Reference: FAA Spec L-853 & RR R & T 1980

SUPPLEMENTAL REFLECTIVE MARKER. Reference: Txwy Ctrl L. Sys 1968

c) Signal Panels, Signal Areas, Indicators, Other Objects & Miscellaney

CHECKERBOARD PATTERNS. An Obstruction Marking. Cross-reference. To speak of Checkerboards seem a natural form of expression but FAA and CAA both add pattern.

Reference: CAA 1953, OML 1991

CHECKERBOARD MARKINGS. This is an Obstacle Marking. The Aid, employed in France, assists aircraft approaches for non-precision instruments, and visual approach operations.

Reference: Supplement 1991

COMPASS CALLIBRATION PAD. This Aid provides a means of calibrating aircraft compasses. Its core is a circle with 12 radials (one per 30 degrees) with 3 magnetic headings for each radial. Radials consists of 6" wide stripes employed in one major form.

Reference: Comp Cal Pad 1969

CONES. This usage from Australia is a short form of Unserviceability Cone Markers. They employ Standard Boundary Marker Cones. Cones are substituted for Flags.

References: Supplement 1961

CONE MARKER. Term is equivalent of Cones/Unserviceability Cones.

Reference: Supplement 1961

FLAGS. Flags can have several uses. Many of them are within Obstruction Markings which see.

References: AD 1951, CAA 1953, Potts IJ 1992, PICA0 1944, AD 1990

GROUND SIGNAL PANELS. The function of the Panels are to control aerodrome traffic. They contain Dumb-Bell Signal, Landing T, Red Square with Yellow cross with yellow diagonal cross.

Reference: AD 1951, 1971

GROUND SIGNAL PANEL & SIGNAL AREAS. Aid conjoins Signal Area and Panels found there in. Area set aside for needed Signal Panel. See Ground Signal Panels, Signal Areas.

Reference: AD 1951

GUIDANCE SIGN BOARDS. An element of Taxying Guidance System. No details in information source.

Reference: Taiwan

HALF DRUM.. This Aid is employed at heliports. It serves as a Corner Marker which see.

Reference: HD 1977

INDICATORS. Overarching term for Wind Direction Indicator or Landing Direction Indicator.

Reference: AD 1951, 1971

LANDING DIRECTION INDICATOR. 1951: T, Landing Tetrahedron or Launch

“T” is orange on white. Tetrahedron is orange or black, white or aluminum; with lights. No details for Launch. 1971: Orange or white for Landing T; also Tetrahedron but no launch. Aid served Ground Signal Panel for 1971; Indicator in 1951.

Reference: AD 1951, 1971

SIGNAL AREA PANEL. The Panel is within Signal Area Location. See also Ground Signal Panel.

Reference: ADM 1983, AD 1971

SIGNAL PANEL. Apparent synonym for Signal Area Panels.

References: Thorn, ADM 1983

TAXIWAY EDGE REFLECTOR. These are elevated, in blue, and cover 360 degrees. They are a supplement to Taxiway Edge Lights.

Reference: IES 1981, 1987

UNSERVICEABILITY CONE MARKER/UNSERVICEABILITY CONE. See Cones.

References: Supplement 1961, AD 1999

UNSERVICEABILITY FLAGS. This is one form of Unserviceability Markers. The Flags are 0.5m square, and red, orange, yellow or r/w, o/w, y/w.

References: AD 1990, AD 1999

UNSERVICEABILITY MARKER BOARDS. These Aids display Red/White or Orange/Violet vertical stripes.

Reference: AD 1990

VEE BOARDS. A Heliport Marking. Similar in appearance to Boundary Markers. They are triangular in shape and elongated. They are found at corner of the installation.

Reference: HD 1977

WIND CONES. Fabric cones with illumination denote wind direction even light

wind.

Reference: Black 1929, Spec for Wind Cone Assem 1985

WIND DIRECTION INDICATOR. A more overarching term though it refers to Wind Cone.

Reference: AD 1951, 1971

WINDSOCK. Alternate name for Wind Cone.

Reference: St John Sprigg 1934

WIND TEE/LIGHTED WIND TEE. An older device for indicating wind direction. A T-shaped structure is painted yellow with green lamps outlining the structure at night. Roller and radial bearings cause the assemblage to move easily. It is referred to as a "Big Sign" by St John Spriggs in the 1930s.

Reference: St John Sprigg 1934, Spec for L-808 Lighted Wind Tee 1965, Airp Mis L Vis Aids 1971

2C Signs and Markings

General Note. These two separate forms are included together in this sub-chapter. While they are distinct forms the coverage of the Database does not require separate treatments. Signs offer a vertical form of Aids while Markings are horizontal. The diverse forms of Markers overlap with Markings. However, differences in terms suggest differences in shape as well as in designating terms. This requires inclusion of terms in more than one location.

2C1 Markings

a) Overarching Terms

AIRFIELD MARKINGS. The specific reference is to tritium wands in Alaska. The specific reference is restricted though the term gives the appearance of a broader term. The reference is also a Lighted Aid.

Reference: Alaska 1984

AIRPORT MARKINGS. Frequently Markings serves as the basic term for Pavement, Surface Markings. This term is a more explicit version of the basic term. It can include Runway and Taxiway Markings.

Reference: Utility Airports 1975, 1981, ADS-GA 1969

AIRPORT PAVEMENT MARKINGS. A general term for Surface Markings including Runway, Taxiway and Holding Position Markings.

Reference: AIM 1999

MARKINGS. This is the basic term for Pavement, Surface Markings. It is employed in a variety of situations both in restricted senses (short form of a specific term) and more general term. More than 20 sources include the term both in general and as “short hand” for a specific form.

Classification #: 334

Operation: messages provided by lines of paint and other substances.
Comments: Markings are also under #335, Markings under the name of Marker.
And under #336, Obstruction Markings
References: Black 1929, ADM 1983, IES 1987, OML 1991, NATO 1992

MARKINGS FOR PAVED RUNWAYS & TAXIWAY. An overarching term for runways, taxiways, apron, roadways.
Reference: Stand for Airp Mkngs 1993

MARKINGS FOR SURFACE. A curious term. Seemingly overarching in nature. However, specific reference is to elimination of current Aids by WAAS.
Reference: Loh 1995

PAINT MARKINGS. These are Surface Markings comprised of paint.
Reference: Finch 1961, Brown 1983

PAINTED MARKINGS. An overarching-appearing term though the specific reference is to Apron Markings. For ICAO the specific reference is to the removal of Painted Markings.
References: IES 1981, 1987, ADM 1983

PAVEMENT MARKINGS. This term refers to all Markings that consist of paint on surfaces. Specific reference is to Heliport Markings.
References: HD 1988, IES 1987, ADM 1983

RUNWAY & TAXIWAY MARKINGS. OA term for a broad range of Markings.
Reference: Marking of Serviceable R & T 1966

STANDARD MARKINGS. A general term that refers to regular Runway Markings though it gives appearance of a more overarching term.
Reference: Finch 1961

SURFACE MARKINGS. A general term though rarely employed.
Reference: Amd 32 1978

SURFACE MARKING COLOURS. ICAO includes a segment on chromacity limits for colors employed in Ground Lights and Surface Markings. They can be viewed as terms for Aids as well.

Reference: Amd 32, 1976

SURFACE MARKINGS & MARKERS. This term also appears in General Overarching terms for Chapter 3. Markers are in a painted and surface form. This term can also apply to coverage of Markers though at variance with precise meaning of Marker.

Reference: ADM 1983

b) Runway Markings

AIM POINT MARKING. No details for this term. It is possibly a variant of the more common Aiming Point Marking.

Reference: Stolport 1970

AIMING POINT MARKINGS. Shorter form of Runway Aiming Point Marking. Its purpose is to furnish a “visual aiming point.” It consists of two stripes about 1000’ from threshold.

Reference: AIM 1999, Stand for Airp Mkngs 1993

ALL-WEATHER RUNWAY MARKINGS. For FAA this level of Marking includes Instrument Runway Markings, Landing Zone Markings, Side Stripes.

Reference: Markings of Serv R & T 1966

BASIC MARKINGS. The FAA has three levels of Runway Markings. This is the simplest form and provides Markings need for VFR operations. They consist of Centerline Markings and Runway Direction Numbers.

Reference: Markings of Serv R & T 1966, AIM 1973

CENTERLINE MARKING. A Runway Marking consisting of dashed lines.

Reference: AIM 1991

CENTRE-LINE MARKINGS/CENTRE LINE MARKINGS. ICAO prefaces

Centre Line Markings with Runway but some entries omit Runway. Czech Republic in Supplement 1961 adds a hyphen.
Reference: Supplement 1961, 1991

CHEVRON/CHEVRON MARKINGS. First term employed as identification of pavement that cannot be used for landing, taxiing, takeoffs. The second term from ICAO is more explicitly an Aid. It specifically refers to pavement before the threshold that is not to be used for aircraft operations. Both Markings employ yellow.
References: AIP 1999, AD 1990

CONFLICTING RUNWAY MARKINGS. Term describes a situation in which Markings that intersect are not properly aligned, positioned.
Reference: Stand for Airp Mrkngs 1993

DAY MARKING OF SNOW-COVERED RUNWAYS. Older Markings in AD add Day to Markings; this was later dropped. Newer sources speak of Markers.
Reference: AD 1953

INSTRUMENT RUNWAY MARKINGS. These Markings consist of Basic Markings plus Threshold Markings.
Reference: Mrkng of Serv R & T 1966, ADS-GA 1969

LANDING ZONE MARKINGS. An element of All-Weather Markings. It consists of Landing Zone Markers which are painted bars on pavements in groups of bars beginning with four and descending to one.
Reference: Mrking of Serv R & T 1966

LONGITUDINAL RUNWAY MARKINGS. Older term for Centerline Marking. Centerlines of courses are longitudinal in direction, shape.
Reference: AD 1951

MARKINGS FOR UNPAVED RUNWAYS. Future category in source. ICAO has Unpaved Runway Markings in some editions of AD.
Reference: Stand for Airp Mrkngs 1990

MARKING OF DISPLACED THRESHOLDS/DISPLACED THRESHOLD MARKINGS. Denoted by four arrowheads, bar across threshold of runway. References: Mrkng of Paved Areas 1987, Mrkng of Serv R & T 1966

MARKING OF PAVED AREAS. Sub-overarching term for Paved Markings. Reference: ADS-AC 1975

MARKING OF SNOW-COVERED RUNWAYS. These are Markers in form. They consist of evergreen or wood tripods. See also Markers. Reference: AD 1951

NON-PRECISION INSTRUMENT RUNWAY MARKINGS/NONPRECISION INSTRUMENT RUNWAY. These are Basic Runway Markings with addition of Threshold Marking. Reference: Stand for Airp Mrkngs 1993, AIM 1973

NONPRECISION RUNWAY & VISUAL RUNWAY MARKINGS. Specific reference is to illustrations of two levels of Markings considered together. Reference: Stand for Airp Mrkngs 1999

PAINTED NUMBERS. Specific references to number on generator house for Airway Beacon. This is not an actual term. Reference: Breckenridge 1955

PAINTED RUNWAY MARKING. These Markings are usually painted but often without mention of paint. The context in this instance is a discussion of color and painted runway Markings placed in contrast to Lights. Reference: ADM 1983

PAVED RUNWAY DAY MARKING/PAVED RUNWAY MARKINGS. Overarching term for all forms of Paved Runway Markings; newer editions drop an overarching term for Runway Markings; apparently there is no further reference to Paved and Unpaved Markings. Older editions included Day for Unlighted Markings including the first named term.

References: AD 1953 (1st), AD 1958, AD 1971

PRECISION INSTRUMENT RUNWAY MARKINGS. For FAA this level of Markings has a full range of Markings: Centerline Marking, Designation Marking, Threshold Markings, Fixed Distance Marking. TD Zone Markings, Side Stripes, Holding Position Markings.

Reference: Mrkngs of Paved Areas 1980, 1987, AIM 1973, AIP 1999

RELOCATED THRESHOLD MARKINGS. These Markings when used as taxiway, consist of a bar across former runway and accompanied by Taxiway Centerline Markings.

Reference: Mrkng of Paved Areas 1980, 1987

RUNWAY -& TAXIWAY - SURFACE MARKINGS. A historic term and a suboverarching term. They include “painted lines and markings”. These included stripes, numerals, transverse bars.

Reference: FR Arcata 1949

RUNWAY CENTRAL CIRCLE MARKING. Aid employed in China. No explanation of use is given in source.

Reference: Supplement 1991

RUNWAY CENTERLINE MARKING/RUNWAY CENTRE LINE MARKING. Basic level of Marking. Consists of dashed line in white. Specific configuration according to level of aviation operations (ICAO). FAA AIP 1999 speaks of “stripes and gaps”.

References: AD 1999, AIP 1999

RUNWAY DAY MARKINGS. An overarching term illustrating and listing levels of Markings and specific forms. Older ICAO publications added Day to Marking.

Reference: AD 1968

RUNWAY DESIGNATION MARKING/DESIGNATION MARKING. Markings consisting of numbers (letters if needed) for designating, identifying runways. The term is a shorter form of the full term. Standards employs both forms.

Reference: Stand for Airp Mrkngs 1993, AIP 1999, AD 1958

RUNWAY DIRECTION NUMBERS. Seemingly, the equivalent of Runway Designation Marking. End of runway marked by number (and letter when needed for multiple runways). White in color. Placed above Threshold Marking.

References: Mrkng of Serv R & T 1966, STOL Ports 1970

RUNWAY EDGE MARKING. FOR AD 1958 these are for Unpaved Markings and can be placed on Light structures or “flat rectangular markers” or conical markers. Stolport refers to the Marking but the reference is to Side Stripes.

Reference: AD 1958, STOL port 1970

RUNWAY END MARKING. Two sources have a Marking by this specific name. In Australia it is a wide stripe (border) the width of the runway and partially extending along runway sides. For PICA0 it is one form of “runway length symbols.”

Reference: PICA0, Supplement 1961

RUNWAY END-ZONE MARKINGS. This term refers to Lights. It is retained here as a cross-reference term because it gives appearance of unlighted Markings.

Reference: FR Arcata 1949

RUNWAY MARKINGS. Overarching term that encompasses the full range of Aids of this form. For FAA and other sources there are three types: visual, non-precision instrument, precision instrument. Classes would appear to be more fitting than type but type is in use. Bars and Chevrons are part of this form. Older ICAO sources included the term; more recently all surface forms are under Marking.

Reference: AIM 1999, Stand for Airp Mrkngs 1993

RUNWAY MID-POINT MARKINGS. This Marking is seemingly found only in Japan. It refers to mid-point of Runway and displays three stripes across width of runway.

Reference: Supplement 1965

RUNWAY NUMBERS. This is a short version of Runway Designation Markings which see.

Reference: Utility Airports 1995

RUNWAY NUMERALS & LETTERS/RUNWAY DESIGNATION NUMBERS & LETTERS. These are part of Runway Designation Markings. The first term is the “physical apparatus” for Markings.

Reference: Mrkng of Paved Areas 1987

RUNWAY SHOULDER MARKING. They are yellow in color and supplement Side Stripes. They denote pavement not used by aircraft. Stripes are slanted and 3’/1m in length and spaced 100’/30m.

Reference: Stand for Airp Mrkngs 1999, Markings of Deceptive 1963

RUNWAY SIDE STRIPES MARKING/SIDE STRIPES MARKING/SIDE STRIPES. These refer to continuous stripes along runway side to delineate runway pavement (full strength) or to provide contrast with surrounding terrain. AD: double stripes in white; FAA: continuous white stripe.

References: AD 1958, 1971, AIM 1991, Stand for Airp Mrkngs 1993

RUNWAY SURFACE MARKINGS. This is possibly an older term for what are now termed Runway Markings. It clarifies the nature of these Aids.

Reference: FR Arcata 1949

RUNWAY THRESHOLD MARKINGS/THRESHOLD MARKINGS. These Markings denote point on runway where landing can be made. They are white in color, consist of longitudinal stripes. ICAO drops Runway from term. AD speaks of long stripes. Older editions include runway in title.

Reference: Stand for Airp Mrkngs 1999, AD 1958, AD 1964

RUNWAY THRESHOLD STRIPES. Can this be viewed as a Marking? Or is it in a sense the “physical apparatus” for Pavement Markings consisting of stripes?

Reference: AIP 1999

SITE NUMBERS. Number painted on generator house for identifying Airway

Beacon location.

Reference: Breckenridge 1955

TOUCHDOWN ZONE MARKINGS/TOUCHDOWN-ZONE MARKING. A series of rectangular Markings painted on surface flanking Centerline Marking. There are 1-6 pairs depending on length of runways. For FAA pairs are in batches of single, double or triple configuration. In some sources these are known as Touchdown Zone Markers.

References: AT 1999, AIM 1991

THRESHOLD MARKINGS. These Markings are a shorter form of the full term. Runway Threshold Markings. Eight longitudinal stripes which are grouped proportionally along centerline.

References: Mrkng of Paved Areas 1987

UNPAVED RUNWAY MARKINGS. Older/somewhat older editions of AD distinguished between paved and unpaved aerodromes and Markings. Newer editions batch all Markings together with no unpaved grouping.

References: AD 1971, 1958

VISUAL & NONPRECISION MARKINGS. Specific reference is of illustrations for both levels of Markings. Runway is omitted through these are Runway Markings.

References: Marking of Paved Areas 1980

VISUAL RUNWAY MARKINGS. Term includes Designation, Centerline, Fixed Distance Markings, Holding Position Markings. An alternate list includes the first two but finishes with Threshold and Aiming Point Markings.

References: AIM 1991 (1st), Stand for Airp Mrkngs 1993 (2nd)

c) Taxiway Markings

AIDS TO TAXYING. These are two forms: Day Marking-Taxying Aids (on Taxi-Channel Lighting supports) and Lighting-Taxying Aids.

Reference: AD 1958

DAY MARKING-TAXYING AIDS. Restricted to Marking of Light Supports for Taxi Channel Lighting.

Reference: AD 1953

PAINTED HOLD POSITION MARKINGS. Conforms to Holding Position Signs for Taxiways/Runway Intersections.

Reference: Stand for Airp Sign Sys 1991

PAVED TAXIWAY MARKING/PAVED TAXIWAY DAY MARKINGS.

Newer editions speak of specific types of Markings but not overarching terms.

AD 1971 has a Paved Markings component as well as an Unpaved Markings component. Day was added to some older terms.

Reference: AD 1971, AD 1953

TAXIWAY CENTERLINE MARKINGS/TAXIWAY CENTRE LINE

MARKINGS. This is the basic level of Taxiway Markings. They consist of continuous stripes in yellow.

References: AIP 1999, Stand for Airp Mrkings 1993, AD 1971, 1999

TAXIWAY CONTINUOUS MARKINGS/TAXIWAY DASHED MARKINGS.

These are part of Taxiway Edge Markings and sometime subsumed under that heading.

Reference: Stand for Airp Mrknks 1999

TAXIWAY DAY MARKINGS. Longitudinal (later centerline) and Taxiway HP Markings made up these Markings at an early date.

Reference: AD 1951

TAXIWAY EDGE MARKINGS. They consists of two forms: Continuous Markings with double yellow line (which distinguishes between taxiway edge and shoulder); and Dashed Markings which indicates non-taxi pavement that aircraft can use (aprons). These Markings delineate edges and are largely employed when pavement edge and taxiway edges are not the same.

References: AIP 1999, AIM 1999, IES 1981

TAXIWAY HOLDING LINE MARKINGS. These Aids are in aviation yellow. They are placed on taxiways where there is a need to keep (hold) airplanes away from runways.

References: IES 1981

TAXIWAY HOLDING POSITION MARKINGS. Markings made up of yellow dashed lines across taxiways.

Reference: AIM 1999

TAXI-HOLDING POSITION MARKINGS. These mark intersections of taxiway and runways.

Reference: Supplement 1971

TAXIWAY IDENTIFICATION MARKINGS. Markings are employed when there are problems in locating Taxiway Identification Signs.

Reference: IES 1987

TAXIWAY INTERSECTION HOLDING MARKINGS. Terms listed but with few details. They are comprised of black dashes across taxiway.

Reference: Stand for Ap Sign Sys 1991

TAXIWAY INTERSECTION MARKINGS. A new Aid at time of source (1989). It consisted of two stripes (6" by 150') parallel to centerline Marking and in Yellow.

Reference: Katz FAA 1989

TAXIWAY MARKINGS. An overarching term that includes basic Centerline and Holding Position Markings. Also includes Taxiway Edge Marking, and other forms as needed. Older sources speak of Holding Lines rather than Holding Position Markings. Yellow is employed for this Marking though AD 1971 calls for white or yellow. AIP 1991 gives green as the color in use. Other sources speak of yellow only.

References: AD 1971, Stand for Arp Mkngs 1993, AIM 1973, Mrkng of Serv R & R 1966, AIP 1991

TAXIWAY ROUTE MARKING. Term refers to Center-Line Lighting (form of Lighting under construction at time of writing, 1962). It is retained here because Marking added to term.

Reference: Horenjeff 1962

TAXI SIDE STRIPE MARKINGS. Marking differentiates load-bearing surface from non-loading bearing surfaces. It consists of a double line.

Reference: AD 1990

TAXIWAY SHOULDER MARKING. These are Markings that indicate paved areas that are not to be used by aircraft (e.g., aprons, holding bays). Also taxiways which may have shoulder stabilization to retard blast, water, erosion but not for aircraft use (hence shoulder markings). They are yellow in color.

Referenc: AIM 1999, Stand for Airp Mrkngs 1993, 1999

UNPAVED TAXIWAY MARKINGS. ICAO publications once contained Markings specifically for non-pavement airports. This practice has been dropped.

Reference: AD 1971

d) Markings Other Than Overarching, Runway, and Taxiway

APPROACH DAY MARKING SYSTEM. These Markings consist of a series of Day Markers. In some instances the structures of Approach Lights can be utilized for this purpose. They begin at Threshold and work outward. They can be three-dimensional or flat Markers. Colors, patterns, physical appearance not given.

Reference: AD 1951, 1953

APRON & HOLDING PAD SHOULDER MARKING. Denotes stabilized shoulders that are not for aircraft use. It includes "Hatch marks" that are "perpendicular to the pavement edge."

Reference: Marking of Deceptive 1963

BLAST PAD & OVER-RUN OR STOPWAY MARKING. Seemingly this corresponds to Displaced Threshold, Blast Pad and Stopway Markings.

Reference: Marking of Deceptive 1963

CLOSED MARKINGS. Markings for closed runways consist of crosses in yellow or white.

Reference: AD 1971, Supplement 1971

CLOSED RUNWAY & TAXIWAY MARKINGS/CLOSE OR TEMPORARILY CLOSED RUNWAY & TAXIWAY MARKINGS. Crosses placed over relevant runways and taxiway. Runways crosses are yellow in color and either 60' x60' or 48x120'; taxiway either 30'x30' or 24'x60').

References: Mrkng of Paved Areas 1987, Stand for Airp Mrkngs 1999, AIM 1999

CENTERLINE & EDGE MARKINGS. Specific reference refers to augmented Aid for special situations of taxiway bridges.

Reference: ADS-TA 1983

CONTINUOUS MARKINGS/DASHING MARKINGS. These forms of Markings are within Taxiway Edge Markings. Continuous Markings separate taxiways from areas not to be used by aircraft. Dashing Markings indicate taxi areas from pavements that may be used by aircraft.

Reference: Stand for Airp Mrkngs 1993

CRITICAL AREA HOLD LINE MARKINGS. Denote sensitive (electronic) areas off-limits to aircraft and "obstacle free areas." They are part of Taxiway Markings.

Reference: IES 1981, 1987

FIXED DISTANCE MARKING. Term employed interchangeably with Fixed Distance Marker. It consists of a black bar denoting distance for approaching aircraft. ICAO speaks of flat Markings in shape of rectangle 15x200' (45-60m), 1000' (300m) from threshold stripe Markings.

Reference: AD 1971, AIM 1991

GEOGRAPHIC POSITION MARKINGS. Aid identifies aircraft location engaged in taxiing during low visibility situation. Markings consist of pink circle with

black symbols (alphanumeric) set within white ring and outer black ring.
Designations refer to position of Markings on taxi route.
References: AIM 1999

HANGER ROOF MARKINGS/ROOF MARKINGS. A variety of similar terms are to be found in Markers. Many forms are Town Markings. All forms are lighted directly or indirectly. Many forms are Town Markings.
Reference: Blee 1929, Black 1929, Wood 1940

HOLDING POSITION MARKINGS. These are Markings are positioned at intersection of taxiway and runway, and entrance of taxiway into ILS or MLS critical area. They are made up of both Markings and Signs. Markings consist of painted Hold Lines and Sign.
Reference: Mrkng of Paved Areas, 1980, 1987

ILS HOLDING POSITION MARKINGS. These are Holding Position Markings that offer protection for critical areas of ILS Localizer and Glide Slope.
Reference: Mrkngs of Paved Areas 1980

HOLDING POSITION MARKING FOR INSTRUMENT LANDING SYSTEM (ILS)/PRECISION OBSTACLE FREE ZONE (POFZ)/ILS CRITICAL AREA/POFZ HOLDING POSITION MARKING. Marking indicates point on taxiway or holding bay where airplane stops if it lacks approval to enter ILS CA or POFZ. Marking consists of double yellow stripes (2 foot wide and 4 foot apart). Stripes linked by periodic double contravening stripes.
Reference: Stand Airp Mrkngs 2004

LONGITUDINAL MARKINGS. Older AD publications refer to Longitudinal Markings while newer publications refer to Centerline Markings.
Reference: AD 1953

MARKINGS & LIGHTING OF CLOSED OR HAZARDOUS AREAS ON AIRPORTS. Term refers to discontinuation of Aids and adding of Aids that indicate closure. Yellow "X"s are a major element of these Markings. For hazardous areas Barricades in orange and white (and orange Flags) are employed.

Cross-referenced because of presence of lights.

Reference: Mrkng of Paved Areas 1980, 1987

MARKING FOR ARRESTING GEAR/PENDENT CABLE MARKING/DISC WARNING MARKER. Both are Reflective Discs that identify cables for arresting gear.

Reference: Stand for Airp Mrkngs 1993, 1999

MARKINGS FOR BLAST PAD OR STOPWAY OR TAXIWAY PRECEDING A DISPLACED THRESHOLD. Overall term for three forms of Markings.

Reference: AIM 1999

MARKING DISPLACED THRESHOLDS, BLAST PADS & STOPWAYS. Overarching term for two separate forms: a) Displaced Threshold Markings which consist of four arrowheads above threshold bar, in yellow or white. b) Markings for Blast Pads & Stopways that display chevron above threshold bar.

Reference: Mrkng of Paved Areas 1980, 1987

MARKING FOR LARGE AIRCRAFT PARKING POSITIONS. Term listed in Standards 1999. Apparently reserved for future use.

Reference: Stand for Airp Mrkngs 1999

MARKING OF HAZARDOUS AREAS. Crosses are employed for this function.

Reference: Marking of Deceptive 1963

MARKING OF TEMPORARILY RELOCATED THRESHOLDS. Temporary Markings find use in construction activity.

References: Stand for Airp Mrkngs 1993, 1999

MARKING OF UNSERVICEABLE PORTIONS OF THE MOVEMENT AREA. Both Markings and Lighting are included. This is a form of Unserviceability Marking which see. Later on it became known as a Closed Marking. The Aid displays a white cross.

Reference: AD 1951

NON-MOVEMENT AREA BOUNDARY MARKING. Marking delineates areas under air traffic control/not under control. Marking takes form of solid line, dashed line in yellow. Solid line denotes non-movement side while dashed line denotes movement side.

Reference: Stand for Airp Mrkngs 1999, AIM 1999

OFF-AIRPORT MARKING/ON-AIRPORT MARKING. First term often refers to painted roof markings giving name or arrow pointing to airport. On-Airport Markings refers to information (airport name, elevation) painted on airport roofs, aprons by airport owners.

Reference: Utility Airports 1975

PAINTED CENTERLINE/EDGE MARKINGS. Terms appear in ADS and refer to augmentation of basic terms. Entry refers to Retroreflective Markers to Markings. Centerline Markings and Edge Markings are basic terms in themselves. Paint is occasionally added to name of term.

Reference: ADS-AC 1971

RUNWAY TRANSVERSE STRIPES/TRANSVERSE STRIPES. The stripes are added to Threshold Markings in specific situations.

References: ADM 1999, ADS-AC 1971

SEAPLANE BASE MARKING. Term refers to a single Aid: Standard Air Marker. It is described in Markers which see.

Reference: Seaplane Base 1994

SEGMENTED CIRCLE/SEGMENTED CIRCLE MARKING SYSTEM.

Segmented Circles are often referred to as Markers; the principal entry is under Markers. This entry is a cross-reference.

References: Utility Airports 1975

STRIATED MARKINGS. Markings employed where “frost heave” is a problem for aviation operations. It consists of painted stripes flanked by unpainted areas. Unpainted areas to be no wider than painted stripes.

Reference: Stand for Airp Mrkngs 1993, 1999

STRIPES. Stripes, which make up Threshold Markings, are the “physical apparatus.”

References: Supplement 1961, 1991

ROADWAY EDGE STRIPES/ZIPPER MARKINGS. These are a form of vehicle Roadway Marking. Known as Zipper Marking because each segment of color is to left or right of preceeding segment of color. They are white in color.

Reference: AIP 1999, AIM 1999

THRESHOLD STRIPES. Alternate name for Threshold Markings. In a sense Stripes are the “physical apparatus” of Markings.

Reference: Supplement 1961, 1971, 1991

SURFACE MOVEMENT GUIDANCE CONTROL SYSTEMS (SMGGS). A System of Aids that provides control, guidance of surface operations. It includes most Lighted and Unlighted Aids on airport surfaces.

References: ADM 1993

SURFACE PAINTED SIGNS.

General Note. In a TCD context Sign-like Aids on pavement are Markings not Signs (Horizontal dimension instead of vertical key element in deciding which are Signs and Marking; perhaps more than form of symbols). But in some major FAA publications Markings on pavement are Signs: Surface Painted Signs (though descriptive coverage can refer to Markings). Sign coverage greatly influences these Aids. Signs on pavement are very much the same as vertical forms. These Aids include the following forms. Selective notes are added when needed.

SURFACE PAINTED TAXIWAY DIRECTION SIGN. AIM 1999, AIP 1999

SURFACE PAINTED LOCATION SIGN. AIM 1999, Stand for Airp Mkngs 1999

SURFACE PAINTED HOLDING POSITION SIGNS. AIP, Stand for Airp Mkngs 1999

SURFACE PAINTED SIGNS. AIM 1999, ST. 1999

SURFACE PAINTED GATES ID SIGNS. Aid in locating of destination

gates. Black symbols on yellow ground. Alphanumeric for gates printed on Signs. Stand for Airp Mkngs 1999
SURFACE PAINTED APRON ENTRANCE POINT SIGN. Sign aids in determining position on apron. Stand for Airp Mkngs 1999.
SURFACE PAINTED DIRECTION SIGN. AIP 1999

TAXIWAY/RUNWAY INTERSECTION MARKINGS. Seemingly an interchangeable, or alternate name, for Taxiway Holding Position Markings.
Reference: Mrkng of Paved Areas 1980, 1987

TEMPORARY MARKINGS. Limited sources include this term. One source includes Lights only with the term; other sources do not provide details.
References: CAA 1941, Wood 1940, Standards 1999

TRANSVERSE MARKINGS. This is not an operational form. It refers to general treatment of Aids.
Reference: ADM 1983

UNDERSHOOT & OVERRUN AREA MARKINGS. These are chevrons in white or yellow that mark non-usable pavement before thresholds.
Reference: AD 1971

UNSERVICEABILITY MARKINGS. A type of Marking that denotes closed runways. Chevrons denote permanent closures while red Flags are employed for temporary closures.
References: AD 1951, AIP 1991

VEHICLE ROADWAY MARKINGS. These refer to Markings on roadways employed by aircraft as well as surface vehicles. Solid lines denotes edges while dashed lines indicate dividing point between lanes.
References: Stand for Airp Mrkngs 1993

A series of terms relate to VOR Aerodrome Check-Point Markings. These are possibly sufficient terms for a special sub-section but, hopefully, this group within an existing category will suffice.

VOR AERODROME CHECK-POINT MARKINGS. Denotes existence of VOR check-point. A sign is associated with this Marking. AD 1958 has a variant term: Vor Aerodrome Check-Point Marker.

Reference: AD 1971

VOR CHECKPOINTS/VOR AERODROME CHECK-POINTS. These slightly variant versions appearing in AD Supplements have the same meaning despite omission of the word Marking.

References: Supplements 1971, 1991

VOR CHECKPOINT MARKING/VOR CHECKPOINT RECEIVER MARKINGS/VOR RECEIVER CHECKPOINT MARKING. Marking indicates that aircraft can check instruments in plane with signals of Navigational Aids. They consist of arrows (pointing in direction for comparing azimuth) and signs added which indicates VOR check course. Black on yellow.

References: Stand for Airp Mrkngs 1993, 1999, AIP 1999

GROUND RECEIVER CHECKPOINT MARKINGS. Seemingly, an alternate name for VOR Checkpoint Markings. Aid consists of yellow arrow within double band circle (yellow and white). Center of circle is black. Sign accompanies Marking.

References: AIM 1999, AIP 1999, Stand for Airp Mrkngs 1993

CHECK-POINT MARKING. Aid has the meaning of VOR Check Point Marking.

Reference: AIP 1991

e) Special Categories

1) Heliport and Vertiport Markings (Also Stolport and Seaplane Bases)

AIMING POINT MARKING. Indicates approach to specific point prior to approach to Touchdown & Lift-off Area. This Marking displays an equilateral triangle with white lines.

Reference: AD Vol II-Heliports 1990

APRON MARKINGS. These are Heliport Markings. HD 1988 refers to a parking position function for this Marking. HD 1994 indicates that these Markings define apron edges while parking positions are separate.

Reference HD 1988, 1994

BOUNDARY MARKINGS. For heliports these are of two forms: Markers and Paint on the ground. Markers can be In-ground Markers or Above-ground Markers. Above ground forms can be of embedded stones, treated timbers, concrete slabs, or low hedges.

References: HD 1988

CENTERLINE STRIPES. Name of Aid or description of Aid employing these words? Either way, the larger category is that of Markings.

References: HD 1994

CYLINDRICAL MARKER FOR HOVER TAXI ROUTE EDGE MARKER/
LARGE MARKER FOR AIR TAXIING CENTERLINE. The first term consists of reflective material 4"x8" in yellow/blue/yellow. The second measures 2'x6' in yellow/green/yellow.

Reference: HD 1994

DASHED FATO MARKINGS. These are surface Marking for heliports. They consist of segmented yellow dashes.

Reference: HD 1994

DOUBLE LINE EDGE STRIPES. Denotes edges of taxi route at heliports. They are in yellow in color.

Reference: HD 1994

EQUIPMENT/OBJECT MARKING. This refers, at least in part, to mobile objects. Markings consist of reflective tape, paint, etc. is employed on maintenance and service equipment and other objects.

Reference: HD 1994

FATO MARKINGS. These Markings consist of white painted line. See also:
Painted Markings. [FATO= Final Approach & Take-Off Area]
Reference: HD 1988

FINAL APPROACH & TAKE-OFF AREA MARKINGS OR MARKERS. They
consist of Corner, Edge Markers.
Reference: AD Vol. 1990

FINAL APPROACH & TAKE-OFF DESIGNATION MARKINGS. This is a
more restricted version of previous term.
Reference: AD Vol H 1990

HELIDECK OBSTACLE-FREE SECTOR MARKING. This Marking displays a
chevron for indicating entrance to sector.
Reference: AD Vol II 1990

HELIPORT "H" MARKING. Term refers to large H that identifies hospital
heliport.
Reference: HD 1994

HELIPORT LANDING AIDS. This Aid consists of both day and lighted forms
with more lighted types.
Reference: Latest Development AI 1991

HELIPORT MARKINGS. This is an apparent overall term for Markings used at
Heliports and Helipads. However, few sources so employ it. Markings (and
Markers) may lack association with Heliports since Marking and Markers are
within a context of heliports. One major source employs this term primarily for
individual forms.
References: AIM 1991, Stand for Airp Mrkngs 1993, HD 1977, 1988

Several terms encompass both Lighted and Day forms:
HELIPORT MARKING & LIGHTING, IES 1972
HELIPORT LIGHTING & MARKING, IES 1981
HELIPORT VISUAL AIDS, HD 1977

HELIPORT GUIDANCE, POSITION & OTHER MARKINGS/GUIDANCE OR POSITION MARKINGS/GUIDANCE & POSITIONING MARKINGS. These terms include a centerline for Taxiway (12" wide in yellow), striped Parking Position Line (6" wide stripe in yellow) and circle for stopping (3") in yellow.
Reference: HD 1977

HELIPORT IDENTIFICATION MARKING. This consists of "H" symbol on cross. When at a hospital the H is red on white cross. Cross positioned to indicate best approach for helicopters.
Reference: AD Vol II, 1990, 1995

HELIPORT NAME MARKINGS. This Marking is added when identification is otherwise inadequate. It can consist of either name or "alphanumeric indicator."
Reference: AD Vol II 1990, 1995, Supplement 1991

HELIPAD & HELIDECK MARKINGS. This term suggests an overall meaning, but instead it is very specific: A line (solid yellow) at edge of Helipad or Helideck apart from a Takeoff and Landing Area, or FATO.
Reference: HD 1988

HOSPITAL MARKING. This term is an overarching term for various types of Markings at hospital heliports.
Reference: HD 1994

HOSPITAL HELIPORT MARKING. This term refers to Marking identifying hospital heliport: red H on white cross.
Reference: HD 1994

IDENTIFICATION MARKING. This term refers to Heliports and includes in turn two terms:

STANDARD HELIPORT MARKINGS. This term provides identification of TD and LA. It consists of an "H" within segmented triangle (made up of dashes in white).

HOSPITAL HELIPORT MARKING. This term displays a red H within a

white cross.

Reference: HD 1977

IN-GROUND FATO CORNERS/EDGE MARKERS. These Markers denote both sides as well as corners of heliports. They are in segmented forms.

Reference: HD 1994

IN-GROUND MARKING. Term has a somewhat overarching character though this form has the specific meaning of “H” (Heliport symbol) and Markers for edges and corners.

Reference: HD 1988

LANDING DIRECTION ARROW. This Marking denotes “preferred approach-departure paths to the heliport”. The arrow is white; lights may be add.

Reference: HD 1977

LARGE MARKER FOR AIR TAXING CENTERLINE. It consists of vertical panels measuring 2’x6’ and divided into three horizontal panels: yellow, green, yellow. The panel is on one foot legs. Designated as Marker though it is more of a Marking or even a Sign (though lacking alphanumeric symbols). A cross reference to Markers would not be inappropriate. It is a heliport Aid.

Reference: HD 1994

MARKING OF CLOSED HELIPORTS. This consists of a cross (St Andrew’s) in yellow which is superimposed over existing Markings.

Reference: HD 1977

MAXIMUM ALLOWABLE MASS MARKING. Indicates weight limit through display of two digits and “t” (tonne).

Reference: AD Vol II 1990

PAINTED H MARKINGS. H (Heliport) symbol applied with paint on surfaces.

Reference: HD 1988

PAINTED MARKINGS. This term can have broad meanings. This specific usage

is for heliports and consists of surface, painted Markings. White painted line.
Reference: HD 1988

PARK POSITION MARKINGS. These Markings consist of a yellow centerline, and accompanied by yellow circle.
Reference: HD 1994

STANDARD HELIPORT MARKING SYMBOL. Symbol denotes location of heliport. It consists of triangle and "H" Boundary Markers. White on blue ground.
Reference: HD 1977

Two terms encompass both Markings and Markers:
HELIPORT MARKERS & MARKINGS, HD 1994
HELIPORT WITH MARKERS & MARKINGS, HD 1994

TAXI ROUTE EDGE MARKERS. These Markers consist of cylindrical Elevated Markers. They are 8" high and display bands of yellow, blue, yellow.
Reference: HD 1994

TAXIWAY ROUTE & TAXIWAY MARKINGS. This appears to be a conjoined term. Edge Markers are employed for taxi routes. They are raised Markers 8" maximum high displaying horizontal bands of yellow, blue, yellow; centerlines are single lines while edges are double.
Reference: HD 1994

TAXI ROUTE MARKINGS. This refers to hover/air taxi routes. They are marked by Above-ground Markers in cylindrical forms. They display horizontal bands of yellow/green/yellow. They are in the form of Retro-reflective Marker.
Reference: HD 1988

TAXIWAY MARKINGS. Term is in context of heliports. It can have a more general, overarching meaning.
Reference: HD 1988

TOUCHDOWN & LANDING AREA MARKINGS. In situations where there is

not FATO a TDLA white line is installed [FATO w/i TOLA when available].
Reference: HD 1988

TOUCHDOWN MARKINGS. Marking denotes specific position for setting down of helicopter.
Reference: AD Vol II 1990

TOUCHDOWN PAD BOUNDARY MARKING. These are Markings for TOLA limits or edges. They consist of 18" wide stripes, solid or segmented for paved areas. Stripes are white and may be of crushed stone. AD has continuous white line, (30 cm wide).
Reference: HD 1977, AD Vol II 1990

WEIGHT LIMIT MARKING. This Marking consists of numerals in red on white ground (square-shaped).
Reference: HD 1977

WINCHING AREA MARKING. This Marking displays solid circle, 5m in diameter in yellow, positioned in clear zone center.
Reference: AD Vol II-Heliports

WIRE MARKING. Denotes wires that may affect helicopter operations. These are Obstruction Markings. A second term in the surveyed source refers to Wire Marking and Lighting.
Reference: HD 1994

A special category is that of Vertiport Markings though few references include it.

VERTIPORT MARKINGS. Overarching term for all Vertiport Markings (and Markers). A variety of specific forms have general names that do not indicate they are part of Vertiport Markings. These forms include:

- IN-GROUND EDGE MARKERS (at edges and also corners)
- RAISED MARKERS (6"/15 cm in height)
- PAINTED LINES (16"/40 cm wide, white in color)
- CENTERLINES (50'/15m x 16" in white)

TAXIWAY MARKINGS (6" wide, yellow for Centerlines)

RAISED MARKERS II (Hover Taxi Route, cylindrical shaped, 3' in height, retroreflectives)

SYMBOL (For Vertiports: a Circle flanked, touched on 4 sides by "T" in white; identifies a Vertiport)

References: Standards for Airp Mkngs 1993, 1999 for core terms of Vertiport Marking; Vertiport 1991 for other terms.

2) Holding Position Markings

HOLDING POSITION MARKINGS. This is apparently the core term for this form. It encompasses forms prefaced by Runway, Taxiway, and more specialized forms which see.

References: AIP 1999

HOLDING POSITION MARKINGS FOR INSTRUMENT LANDING SYSTEM (ILS)/HOLDING POSITION MARKINGS FOR INSTRUMENT LANDING SYSTEMS. They perform the same function as those including Critical Area in the title.

References: AIP 1999, AIM 1999

HOLDING POSITION MARKINGS FOR INSTRUMENT LANDING SYSTEM/MICROWAVE LANDING SYSTEM (ILS/MLS) CRITICAL AREAS/HOLDING POSITION MARKINGS: ILS CRITICAL AREAS/HOLDING POSITION MARKINGS FOR ILS (OR MLS) CRITICAL AREA. Markings offer protection for ILS, MLS equipment installations near aircraft operations. References: Marking of Paved Areas 1987, AIP 1999, Standards for Airp Mkngs 1993

HOLDING POSITION MARKINGS FOR TAXIWAY/TAXIWAY INTERSECTIONS/HOLDING POSITION MARKINGS: TAXIWAY/TAXIWAY INTERSECTIONS/RUNWAY HOLDING-POSITION MARKINGS ON TAXIWAY. Consists of single yellow dashed line. Hold position just outside taxi intersection. Second and third terms are variant forms.

References: AIP 1999, AIM 1999, Standards for Airp Mkngs 1999

HOLDING POSITION MARKINGS ON RUNWAYS. Seemingly a single term for all forms. Narrative speaks of HP Markings for different positions but it is unclear if these are formal terms. These terms include:

HOLDING POSITIONS FOR RUNWAYS/RUNWAY INTERSECTIONS

HOLDING POSITION MARKINGS FOR RUNWAY/TAXIWAY

INTERSECTIONS

Reference: Stand for Airp Mkngs 1999

INTERMEDIATE HOLDING POSITION MARKING. Displays single dashed (or broken line). Denotes holding position at “a remote de/anti-icing facility adjoining a taxiway.”

Reference: Stand for Airp Mkngs 1999, AD 1999

INTERMEDIATE HOLDING POSITION MARKINGS FOR TAXIWAY/TAXIWAY INTERSECTIONS. This form employed in three situations: holding planes at T/T intersections; giving geographic position, or holding bay. Consists of single dashed yellow stripe.

Reference: Stand for Airp Mrkngs 1999

ROAD-HOLDING POSITION. This form follows local TCD regulations.

Reference: AD 1990

RUNWAY HOLDING POSITION MARKINGS. Indicates positions for stopping. It consists of four yellow lines: two solid, two dashed. Stopping point on solid stripe side. Two sub-forms:

RUNWAY HOLDING POSITION MARKINGS ON TAXIWAY

RUNWAY HOLDING POSITION MARKINGS ON RUNWAYS

References: AIM 1999, Stand for Airp Mrkngs 1993, 1999 (sub-forms)

RUNWAY-HOLDING POSITION MARKING. ICAO offers a hyphenated form. There are two patterns: “A” (conforms to standard US form); “B” (conforms to ILS in US). Several rules govern use of this Marking.

Reference: AD 1990

TAXI-HOLDING POSITION MARKING. Apparently two forms: single solid/single dashed line and double solid/double dashed stripes. Located at intersections of taxiways and runways.

References: AD 1971

TAXIWAYS LOCATED IN RUNWAY APPROACH AREAS [MARKINGS]. The word Marking omitted though attached to adjoining terms. Marking indicates aircraft are hold in approach/departure part of runway.

Reference: AIP 1999

3) Obstruction Markings

FLAGS/FLAG MARKERS. Second term is full name. Employed when paint or spherical Markers not feasible. Temporary situation common reason for use. Flags are rectangular in shape. Colors: solid aviation orange, orange/white triangular pattern, checkerboard pattern in orange and white. ICAO refers to mobile objects and does not mention temporary usage. Fixed objects use solid or triangular patterns. Mobile objects use checkered patterns.

References: OML 1973, 1999, AD 1999

MARKERS [WITHIN CONTEXT OF OBSTRUCTIONS MARKINGS]. Term is in Obstruction Aids . It is a component of Markings rather than a subdivision in itself. It consists of Spherical Markers and Flags. Flags have an independent character in some sources, situations.

Reference: OML 1991

MARKINGS [WITHIN CONTEXT OF OBSTRUCTION MARKINGS]. Overarching term for Day Aids-Obstruction [ICAO Marking of Objects]. Obstructions place in [] to differentiate from other uses. Divided into Patterns and Markers which see.

Reference: OML 1991

NAVIGATIONAL BOUNDARY & OBSTRUCTION MARKER. Military specifications for Lights. Cross-reference.

Reference: OML 1973

OBSTRUCTION IDENTIFICATION. Seemingly equivalent of Obstruction Marking and Lighting. Sub-overarching term. Day portion is divided into colors and Markers (Spherical Markers, Flags).
References: IES 1981, 1984

OBSTRUCTION LIGHTING & MARKING. Variant formulation. See Below.
Reference: HD 1988

OBSTRUCTION MARKINGS. Seemingly, there are two meanings. Unlighted Markings (1), and Day Marking of Obstructions and Lighting of Obstructions (2). More limited meaning can be viewed as overarching term for such Markings.
Reference: ICAO AD 1951, 1969, 1971 (2), OML 1991 (1)

OBSTRUCTION MARKINGS & LIGHTING. Cross-reference. Main entry in overarching terms for sub-chapter
Reference: OML 1991

OBSTACLE MARKING. It gives the appearance of overarching term though specific reference is to a Neon Light employed for this purpose; no separate day aspect.
Reference: Omnipol

PAINTED CONES FOR DAY MARKINGS. Day portion of Boundary Lights. Color schema includes: White or yellow Lights accompanied by chrome yellow with black band-horizontal. Green accompanied by vertical band of chrome yellow/black. Red joined by horizontal white band/light vermillion main color.
Reference: Blee 1929

PATTERNS. This refers to paint applied in standardized designs. There are several specific patterns:

SOLID PATTERN in aviation surface orange.

CHECKBOARD PATTERNS. Consists of alternate rectangles of orange and white. Employed on storage tanks, buildings, large structures.

ALTERNATE BANDS. Employed on tall, narrow structures (communication towers, smokestacks, etc.). Colors: orange and white.

TEARDROP PATTERNS. A pattern of vertical stripes in alternate colors of orange and white. Employed on spherical water storage tanks.
References: OML 1973, 1978

SPHERICAL MARKERS. These Markers are employed on catenary wires. Spheres are frequently alternated by colors of aviation orange, white, yellow.
Reference: OML 1991

VISUAL AIDS FOR DENOTING OBSTACLES. Divided into two forms: Marking of Objects, and Lighting of Objects. Note: process of marking and lighting not the same as marking and lighting.
Reference: AD 1999, AD 1990 Vol II

4) Apron Markings

APRON MARKINGS. These Markings are employed for the manouevring and parking of aircraft. A key form are Guide Lines found within Aircraft Stand Markings. Reference for entire segment: ADM 1983, 1993
The following are major forms:

GUIDE LINES. These are Aircraft Standing Markings made up of Guide Lines. They indicate path of movement.

Three Basic subdivisions are:

LEAD-OUT LINES. Indicate Stand to Taxiing

LEAD-IN LINES. Provides guidance from apron taxiway to particular stand

TURNING LINES. If turning is required on that stand these Lines indicate procedure.

There are also subdivisons with Lines. These include

SIMPLE LEAD-IN LINES

STRAIGHT-IN-LEAD-IN-LINES

SIMPLE NOSE-WHEEL LEAD-IN LINE

SIMPLE NOSE-WHEEL LEAD-OUT LINE

WING TIP CLEARANCE LINES. Indicates safety zone between wing tips.

TOWING LINES. Indicates Guidance Lines when towing needed.

EQUIPMENT LIMIT LINES. Denotes boundaries for parking various equipment

other than aircraft.

PASSENGER PATH LINES. Displays zebra hatching for safe walking areas.

REFERENCE BARS. Provides supplemental information (Primary information is from Guidance Lines).

TURN BARS. Indicates where Turns begins. Part of Reference Bars.

STOP LINE. Point for stopping. Part of Reference Bars.

2C2 Signs

a) Overarching Terms

SIGNS. This basic term can have both general and specific meanings. It can encompass all Signs forms, and it can be employed as shorthand for various specific types of signs. Signs have a vertical dimension and normally do not include sign-type Aids affixed to pavement surfaces. Many forms have or can have a lighted dimension. Is light playing a different role than in, for example, a Runway Light or Airport Beacon? Perhaps a position can be developed for both perspectives: Light is an integral part of the message, or light is a substitute for natural light. References for Signs include many of the surveyed sources.

Classification #: 328

Form of Device: Unlighted Aero Aid [Classification uses non-standard term]

Operation: Messages presented through alphanumeric symbols (words, letters, numbers)

Comments: Classification in Part G has dual illuminated/non-illuminated category. Database lists signs without mention of lighting or lack thereof.

Classification of 2003 lists signs under unlighted heading but a partially-lighted category (#328) is in partially-lighted Aids.

SIGN SYSTEM. This term is seemingly an integrative network of signs comprising various classes and types. The specific reference is to Taxiway Guidance Signs: classes (Destination Signs, etc), and Types (either Mandatory or Information).

Reference: Stand Airp Sign Sys 1991, IES 1991

components of terms are in the literature.

AIRPORT SIGNS. Relatively few sources employ this term. Specific names and the general term of Sign are much more common. It obviously serves as an overarching term.

References: New Era, FAA ASV 1992, AIP 1999

AIRPORT SIGN SYSTEMS. An overarching term which refers to a series of Signs in an integrated arrangement. The term refers to title of A/C Standards.

Reference: New Era, FAA 1992, Stand for Airp Sign Sys 1991

AIRSIDE SIGN SYSTEM. An apparent overarching term from Vomar Intl.

Reference: US Rules Change AI 1992

AIRSIDE SIGNAGE. An overarching term. Sign refers to an "aggregation of signs."

Reference: US Rules Change AI 1992, McLendon

AIRWAY SIGNS. This term refers to Roof Signs though the term suggests broader usages. Admittedly, other Sign forms were limited in the 1920s.

Reference: Young 1928

SIGNING AIDS. Title of chapter in publication includes the word Sign. But specific coverage begins with this term. Though specific Aids are termed Signs.

Reference: AD 1971

SIGN ARRAY. An amalgamation of several sign components in an integrated pattern.

Reference: New Era, FAA 1992

b) Sign Forms Other Than Runway & Taxiway Types

General Note. Some -- and possibly many -- of these Signs can be assigned to Taxiway or Runway categories. Possible reassignment is in order, or cross-references can be added.

AERODROME IDENTIFICATION SIGN. Sign reflects name of aerodrome. It is part of the Aids to Location Signs. Sign required when aerodrome is not adequately identified by other visual identification methods. Consists of name of aerodrome. Characters are at least 10' in height.

Reference: AD 1951, 1971

AIRFIELD DIRECTIONAL SIGNS/RUNWAY & TAXIWAY DIRECTIONAL SIGNS. These are apparently informal variant names for the standard Direction Signs and conforms to it.

Reference: ATC

ALD AIRPORT SIGNS. A physical term. ALD=Alternative Lighting Devices. Lighting Fixtures with internal lighting. ALD includes LED and Cold Cathode energy sources. Incandescent and Xenon forms are excluded.

Reference: Specs T & R Signs 2004

CAUTIONARY SIGNS. Term suggests relatively broad meaning. However, meaning is actually restricted. It is employed for informing pilots of runway/taxiway bridge. A dated term.

Reference: ADS-AC 1971

CONVENIENCE SIGNS. Provides directions to specific positions, locations (either aprons, or w/i aprons).

References: SEPCO, Spec for L-859 RR Txwy Guid Signs 1970

DIRECTION SIGN. These Signs provide direction for taxiways that exit from intersections. The messages are black on yellow. Arrows indicate direction of turning. There are two forms: Taxiway Direction Sign, and Runway Exit Signs.

Reference: Stand Airp Sign Syst 1991

DIRECTION SIGNS FOR RUNWAY EXIT. Sign displays symbols of black on yellow. It includes letter and arrow. AIM 1999 has a different configuration of Sign names. This term and the next two are forms of Direction Signs.

Reference: AIM 1999

DIRECTION SIGN ARRAY FOR SIMPLE INTERSECTIONS. Direction Sign Array with Location Sign positioned on far side of intersection.
Reference: AIM 1999

DISTANCE TO GO SIGN. Apparently this is comparable to a Distance Remaining Sign. See Runway Distance Remaining Sign.
Reference: C-H

DOT MATRIX/DOT MATRIX RUNWAY DISTANCE REMAINING SIGNS/ TYPE L-858 DOT MATRIX SIGNS. Terms are both physical and morphological. These units employ LED or Fiber Optics. They generate "sign legend character [s]". Signs with this character are used for Runway Distance Remaining Signs.
Reference: Specs for T & R Signs 2004

ENTRANCE-EXIT SIGNS. These are Lighted Signs that identify taxiways, runways. Message patterns include: black on yellow for runway exits, taxiway inter- sections; Yellow on black for "Distinction Sign;" white on blue for "apron exit on taxiway supplementary information" application; and white on red for runway distinction application. Omnipol is a Czech firm.
Reference: Omnipol

EXIT SIGNS. Sign provides identification from runway exit.
References: IES 1981, 1987

HOLDING POSITION FOR ILS CRITICAL AREAS/PRECISION OBSTACLE FREE ZONE (POFZ) BOUNDARY. Sign indicates either holding position of POFZ Boundary. Sign includes letters ILS in white on red ground. It is a Mandatory Instruction Sign.
Reference: Stand Airp Sign Sys 2004

ILS CRITICAL AREA/POFZ BOUNDARY AND CAT II/III OPERATIONS. Sign indicates ILS CA or POFZ or HP. Symbol is that of ILS HP Marking in black on yellow ground. Note: FAA views this as a Sign even though Alphanumeric symbols are lacking. However the symbol is a discrete object

within physical boundary of structure. Taxiway Ending Marker, by contrast, is not seen as a Sign. In that case the symbols (diagonal yellow stripes on black ground) encompass the structural face. It is conterminous with the outside dimensions.
Reference: Stand Airpt Sign Sys 2004

ILS CRITICAL BOUNDARY SIGN. Denotes boundary of critical area. Aids aircrew in determining if they are outside that area. It displays black graphic on yellow ground. Graphic is that of ILS Holding Position Surface Marking.
Reference: AIM 1999

INTERNALLY LIGHTED SIGNS/EXTERNALLY LIGHTED SIGN. These are primarily terms of physical apparatus.
Reference: ADM 1983

INTERSECTION SIGNS. This is a Taxiway Guidance Sign. It is infrequently employed since term usually prefaced by qualifying. Denotes taxiway, runway intersections.
References: IES 1981, Txwy Guid Sign Sys 1980

NO ENTRY SIGN. Sign prohibits entrance to an area. Displays horizontal bar within circle on square ground. Somewhat akin to European TCD No Entry Sign.
Reference: AD 1990, AIP 1999, ADM 1983

SIGNS PROHIBITING AIRCRAFT ENTRY INTO AN AREA. Refers to No Entry Sign.
Reference: AIP 1999

SPECIAL PURPOSE SIGN. Sign denotes entrance into "special condition areas." A Taxiway Sign.
Reference: IES 1981, 1987

STATION SIGN. Markers on "Model Airway Route" (1928). Sign provides location information. Station Sign is an analogy with Station Signs at railroad station signs.
Reference: Making the Air Safe LD 1928

station signs.

Reference: Making the Air Safe LD 1928

STOP SIGNS. This is one of the Mandatory Signs. White inscription on red ground. It is placed where Mandatory stop is needed. It is within Taxiway Guidance Signs.

Reference: ADM 1983

UNLIGHTED SIGNS. Probably overarching. Specific reference: one type of Taxiway Guidance Signs. Black symbols on yellow ground.

Reference: Specs for L-839 Txwy Guid Signs 1979

VOR AERODROME CHECK-POINT SIGN. This Sign adjoins Check-Point Marking. It displays several forms of information including: VOR denoting Marking is VOR Check-point/radio frequency/VOR reading/Distance to enclosed DME. It is lighted. Yellow symbols on dark ground (internally lighted), Dark symbols on yellow ground (externally lighted).

Reference: AD 1971

c) Runway Signs

ONE-HALF RUNWAY DISTANCE REMAINING SIGNS. One form of Runway Distance Sign. It produces distance information. White numbers on black ground.

Reference: Specs for Rnwy & Txwy Lights Signs 1975

RUNWAY APPROACH AREA BOUNDARY SIGN. This Sign indicates when outside runway area.

Reference: Stand for Airp Sign Sys 1991

RUNWAY APPROACH AREA HOLDING POSITION SIGN. Sign for HP when plane is an approach, departure area. Sign displays number for runway end (approach) with abbreviation for approach (APCH).

Reference: Stand for Airp Signs 1991

Reference: AIM 1999, AIP 1999

RUNWAY DISTANCE REMAINING SIGNS/RUNWAY DISTANCE REMAINING SIGNS. Indicates remaining distance on runway (1000' increments). White symbols on black ground. According to Standards these Signs are lighted when Runway Lights are on.

Reference: AIP 1991, Stand for Airp Sign Sys 1991, AIP 1999, Cegelec (hyphenated form)

RUNWAY EXIT SIGNS. One form of Direction Signs. Seemingly similar in appearance to Taxiway Direction Signs.

Reference: Stand for Airp Sign Sys 1991

RUNWAY HOLDING POSITION SIGN. Positioned at holding position on taxiways intersection with runways (or runways intersecting other runways). Inscription is for relevant threshold of runways (to left, to right).

Reference: AIP 1999

RUNWAY INTERSECTION SIGNS. These are Signs at each of runway with numbers and letters. These are one form of Intersection Sign. Message of yellow symbols on black ground.

Reference: Txwy Guid Sign Sys 1968

RUNWAY LOCATION SIGNS. Sign displays number that indicates adjacent runway. Numbers are yellow with black ground and yellow border.

Reference: AD 1999

RUNWAY MARKING SIGNS. This may suggest an overarching term but it refers specifically to Runway Designation Numbers & Letters (the latter for parallel runways). A historic term.

Reference: PICA0 1944

RUNWAY SIGNS. Overarching term for all forms. Specific reference is Runway Signs that are lighted (internally).

Reference: Curved Signs AI 1989

RUNWAY SAFETY AREA/OFZ & RUNWAY APPROACH AREA BOUNDARY SIGNS. Boundary Signs for Safety Area and Obstacle Free Zone (OFZ).
Reference: AIP 1999, Stand for Airp Sign Sys, 1991

d) Taxiway Signs

NON-ILLUMINATED TAXIWAY GUIDANCE SIGNS. An older term that includes the lack of lighting in the title. It serves as an overarching term that includes Informational, Conventional and other Sign forms.
Reference: SEPCO 1978

SIGNS, TAXIWAY GUIDANCE/SIGNS, GUIDANCE/RETROREFLECTIVE TAXIWAY GUIDANCE SIGNS. These terms are older titles for the core term of Taxiway Guidance Sign. Two are of a more bureaucratic nature (general term first then qualifying term) and one includes retroreflective in the title; that dimension of unlighted Signs is now a common place element and less often included.
References Ap L Eq 1971, 1973, 1976, 1982

TAXIWAY DIRECTION & LOCATION SIGNS. Sign array that includes both forms of Signs.
Reference: New Era FAA 1992

TAXIWAY DIRECTION SIGNS. A Sign that indicates taxiway direction out of intersection; arrow indicates taxiway alignment.
Reference: Stand for Airp Sign Sys 1991, New Era FAA 1992

TAXIWAY IDENTIFICATION SIGN. Signs located at taxiway intersections, taxiway exits. Black symbols on yellow ground with black rim.
Reference: Stand for Airp Sign Sys 1984

TAXIWAY GUIDANCE SIGN. This may present a specialized meaning though it is frequently an overarching term for Taxiway Signs. Standards 1991 lists several including Mandatory Instruction Signs, Location, Direction, Taxiway Ending Marker, Destination. ADM 1990 employs it as an overarching term under

headings of Mandatory and Information forms. AD arranges Signs under Mandatory or Information headings without term.

References: Stand for Airp Sign Sys 1991. Specs for L-858 Retro Tx Guid Signs 1979, ADM 1990, IES 1981, 1987

TAXIWAY GUIDANCE SIGN SYSTEM. System added to Signs. It is an element of “a surface movement guidance control system.”

Reference: Stand for Airp Sign Sys 1991

TAXIWAY LOCATION SIGNS. This Sign designates Taxiway. It can be free-standing or conjoined with Direction Signs.

Reference: AIP 1999

TAXIWAY/RUNWAY INTERSECTION SIGNS. This is a Mandatory Sign. It can be employed in place of Stop or HP Sign. It gives runway designation for ends of runways that intersect.

References: ADM 1983, AD 1999

TAXIWAY SIGNS. An overarching term for Taxiway Signs of all types.

Reference: Curved Signs AI 1989, Cegelec, Txwy Guid Sign Sys 1968

TAXIWAY SIGN SYSTEM. Signs found at taxiway intersections or runway exits. Letters identify taxiways. Letters are black on yellow with black rim.

References: IES 1987, Txwy Guid Signs Sys 1968

e) Special Category: Holding Position Signs

CATEGORY II CRITICAL AREA HOLD LINES SIGN/CATEGORY II HOLD LINE SIGN. Second Sign marks end of Hold Line Markings; First Sign employed on runways to denote critical areas where Hold Line Markings are not employed on Runways. Hold Lines are seemingly an older term for Holding Position Lines.

Reference: Txwy Guid Sign Sys 1968

HOLDING POSITION SIGN. A series of signs that make up Mandatory Instructional Signs. Sign indicates entrances to runways, critical areas. White

symbols employed on red ground. Arrows rarely employed. Categories for Taxi/Runway Intersections, Runway/Runway Intersections/ILS Critical Areas Runway Approach.

Reference: Stand for Airp Sign Sys 1991

HOLDING POSITION SIGN AT BEGINNING TAKEOFF RUNWAY. Signs displays single number only. Employed at taxiway intersecting take off runway.

Reference: AIM 1999

HOLDING POSITION SIGNS FOR APPROACH AREAS. Sign employed in approach area where plane on taxiway encroaches runway safety area or runway airspace. Sign displays runway number and abbreviations for approach (APCH).

Reference: AIM 1999, AIP 1999, Stand for Airp Sign Sys 1991

HOLDING POSITION SIGN FOR ILS CRITICAL AREA/ILS HOLDING POSITION SIGN/ILS CRITICAL AREA BOUNDARY SIGN. Sign displays letter "ILS". Holdline at boundary of critical area.

Reference: AIP 1999, Stand for Sign Sys 1991

HOLDING POSITION SIGNS FOR TAXIWAY/RUNWAY INTERSECTION/
HOLDING POSITION SIGN FOR RUNWAY/RUNWAY INTERSECTION.

These Signs designate holding position by display of numbers. (Two such numbers are separated by dash).

Reference: Stand for Sign Sys 1991

HOLDLINE SIGNS. Seemingly older name for Holding Position Signs. Follows HP format of white symbols on red ground.

Reference: Specs for T & R Signs 1983

ROAD-HOLDING POSITION SIGN. Denotes road entrance to roadways. White on red ground. Indicates stopping is mandatory; possible other requirements.

Reference: AD 1999

RUNWAY-HOLDING POSITION SIGN. Denotes HP at extremity of runways, or at taxiway/runway intersection or runway/runway intersection.

RUNWAY-HOLDING POSITION SIGN. Denotes HP at extremity of runways, or at taxiway/runway intersection or runway/runway intersection.

Reference: AD 1999

CAT I, II, III HOLDING POSITION SIGNS/CAT II HOLDING POSITION SIGNS/CAT II OR IN HOLDING POSITION SIGNS/CAT II AND HOLDING POSITION SIGNS. The several forms are very similar terms in various configurations. Signs identify holding position at runway threshold. Signs are within Mandatory Instruction Signs and follow that configuration.

References: ADM 1983, 1993, AD 1999, AD 1971

f) Sign Forms Other

DESTINATION SIGNS. The purpose of these Signs is to provide directions to "remote locations." Apparently an extension of Taxiway Direction Signs. Those Signs normally will suffice but confused situations, remote locations may require Destination Signs.

Two specific forms

OUTBOUND DESTINATION SIGNS. Provide directions to takeoff runways with message composed of runway number and arrow.

INBOUND DESTINATION SIGNS. Provides information on different types of aprons, various services.

References include: Stand for Airp Sign Sys 1991, AIP 1991, 1999

SURFACE PAINTED SIGNS. This category of Aid has been assigned to Markings which see.

GUIDANCE SIGN. Possibly an equivalent of Information Signs. Commonly employed within context of taxiway: Taxiway Guidance Signs.

Reference: Berry IJ 1992, Specs for R & T Edge Light 1975, VI

INFORMATION SIGN. One form of Taxiway Guidance Signs. It gives location, route information.

Reference: Latest Development AI 1991, IES 1981

INFORMATIONAL SIGNS. Only a few sources employ this term; a possibly dated term. It may be a variant form of Information Sign.

Reference: Retro Taxi Guid Sign 1970, Specs for T & R 1983, VI

INFORMATIVE SIGN. Seemingly a variant name for major category of Information Sign. It denotes locations, destinations.

Reference: NATO 1992

LOCATION SIGN. Denotes runway end, taxiway-runway intersections, taxiway/taxiway intersections. A form of information Sign.

Reference: Berry IJ 1992, ADM 1993, AIM 1999

MANDATORY INSTRUCTION SIGN. Older version spoke only of Mandatory Sign but both ICAO and FAA have added Instruction to name. Sign denotes areas which cannot be entered without air control approval. The Sign includes Runway Designation Signs, Holding Position Signs, No Entry Sign which see.

References: AIP 1991, AID 1971, AD 1999

MANDATORY SIGN. Older name for key category of Signs. Denotes situations that could result in hazards if sign ignored. White on red ground.

References: IES 1981.

ROADWAY SIGNS. Refers to road intersecting with Runway, Taxiway. It requires Standard Stop Sign.

Reference: Stand for Airp Sign Sys 1991

CHAPTER THREE

RADIO AIDS

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- Ten-Centimeter Glide Path
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- Indianapolis System
- Landing-Aid Version
- Landing Beam
- Landing-Beam System
- Landing-Beam Transmitter
- Landing Safety Enlished (LSE)
- Locator Station
- Lorenz System
- Lorenz Thick Weather System
- Loth System/Leader Cable System/Dingley Leader Cable System/Leader-Cable-Type System
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- Low-Tech VHF System
- Marconi Ultra-Short Wave Equi-Signal Approach Beacon
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 LDME

VOR/Distance Measuring Equipment
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Compass Locator Station
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Glide Slope Radio Course
Glide Slope/Glide Path
Glide Slope Facility
Glide Slope (GS) Facility
Glideslope
Glide Slope System/Glide-Slope System
Glide Path
Glide-Path (GP)
ILS Glidepath Transmitter
ILS Glideslope
Null-Type Glide Slope
 Sideband Reference (SBR) Image System
 Capture Effect (CE) Image System
 Basic System
 Upslope End-Fire System
Straight-Line Glide Path

- ILS Glide Slope
- ILS Glide Slope Subsystem
- Two-Frequency Glide Path System
- UHF Glide Slope Transmitter/UHF Glide Slope
- ILS Glide Path Transmitter
- ILS Glide Path
- Localizer Unit (LO)
- Localizer
- Wide-aperture Localizer
- ILS Localizer
- Offset Localizer
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- Localizer Facility
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 - Locator Middle Markers/Outer Middle Markers
 - IM, OM, MM, LOM, LMM
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Tactical MLS Station
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MLS/RNAV
MLS Precision Distance Measuring Equipment
Doppler MLS
Time Reference Scanning-Beam System
Scanning Beam MLS
SCAMS
Stol/MLS

Azimuth Station
Elevation Station
MLS Azimuth/MLS Azimuth Station
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 - The Wireless Lighthouse
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 - Bellini Tosi System/Bellini-Tosi System/Bellini D/F System
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Unsymmetrical Four-Course Beacon

Double Modulation Beacon

Four-Course Double Modulation Beacon

Triple Modulation 12-Course Equi-Signal Beacon

Radio Range Beacon/Radio-Range Beacon

Radio Marker/Radio Marker Beacon/Radio-Marker Beacon

Radio Navigation Beacon

Radio Equi-Signal Beacon System

Radio Range Station/Radio Station

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CAA MRA Range

Adcock Range

CAA MRL Range

Loop Type Range

Loop Range

Range

Aircardi System

Aural Radio Range

Aural Range

Aural-Type Radio Range Beacon

Directive Beacon

Loth System of Rotating Beacons/Loth System of Twin Rotating Beacons

Low/Medium Frequency Radio Range

Low/Medium Frequency Radio Range (LLFR)

Low or Medium Frequency Radio Beacon

Low or Medium-Frequency Radio Range

Low and Medium Frequency Radio Range

Low-Frequency Four-Course Range

Low-Frequency Radio Range

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- VHF Omni-directional Radio Range (VOR)
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 Tacan System

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 HVORTAC
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 Doppler VOR/DME
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 VORTAC
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 VHF Omni-Directional Range/Tactical Air Navigation
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 Special Category Landing System
 DGPS Ground Reference System
 DGPS Ground Station
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Navigation Satellite System
Navsat
Satcom/Satcom/Satnav
Satellite Navigation
Satellite-Assisted Navigation (GNSS/GPS)
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Starfix/Starfix Positioning System

Timation
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 TSPI System
 Artemis Satellites/IOR Inmarsat III Satellite
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 NDB (Non-Directional Beacon)
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 Compass Locator
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Short-Wave Direction Finding

Ground Ray D.F.

Rotating Form Apparatus for Short-Wave Ground Ray D.F.

Marconi Portable Short-Wave D.F. Type D.F.G.15

Telefunken Ground Ray Short-Wave Portable D.F. Type P 57N

Rotating Spaced Frame Systems/Eckersley-Marconi Rotating Frame Apparatus

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3B Radio Aids Overarching Terms

3B1 General Terms

AERO ELECTRONIC NAVIGATION AIDS.

Classification #: 35

Form of Aid: Radio Aids to Navigation

Operation: A variety of patterned radio emissions transmitted to receivers of diverse forms.

Comment: An overarching term for all Aids in classification. Term appears in classification. But in external sources?

AERONAUTICAL RADIO NAVIGATION. General term from Kendal in his study of "Directional Radio Techniques" (1910-1940). It includes Rotating Beacon, Course Setters, VOR. Term also include airborne equipment.

Reference: Kendal 1990

AERONAUTICAL RADIO NAVIGATION SERVICE. A slight variation from the basic term. Possibly of more recent vintage.

Reference: AT 1985, Lexicon 1985

AERONAUTICAL RADIONAVIGATION SERVICES. Term from ICAO AT Procedures. It is influenced by ITU radio regulations. Term refers to "Radio-location service" for aviation use with three functions: position-determination, direction determination, obstruction warning.

Reference: AT 1958, Lexicon 1985

AIR NAVIGATION AIDS/AIR-NAVIGATION AIDS. The main entry is in general overarching terms; it is included here since several sources refer exclusively to Radio Aids. Second term includes Ranges, Markers, ILS; also radar.

References: AIM 1991, NOTAMS 1987, DOT/AID ... SE Asia 1971, Casabona 1959

AIR NAVIGATION & CONTROL AIDS. Term apparently referring to Aids to

Navigation, and Air Traffic Control Devices in 1940s.

Reference: Conway 2006

AIR NAVIGATION RADIO AIDS. This term is partially a Navaid term. For PICA0 it includes Aids but also radio stations. AIM includes Navaids and also radar, flight management systems.

References: PICA0 1944, AIM 1999

AIR NAVIGATIONAL FACILITY (NAVAIDS). A general term that more plausibly belongs with General Overarching though often associated with radio forms. It includes visual and radio aids and also facilities aiding flights including landing areas.

Reference: AIM 1973

AIR NAVIGATIONAL RADIO AIDS. A broad term that includes Terminal and En-route Aids; also includes INS, FMS though not radar.

References: AIM 1991

AIR NAVAIDS. Term refers to Radio Aids, and also radar. Context of publication, including title, has an impact on components of term. It is included in this segment as a cross-reference.

Reference: DOT & Aids ... SE Asia 1971

AIR NAVIGATION SYSTEMS. A very broad term that encompasses Aids but also goes beyond them. It includes early to recent developments.

Reference: Kendal 1990.

AIRCRAFT APPROACH & LANDING SYSTEMS. Overarching term for systems providing guidance in approaching a runway and in landing.

Reference: Keen 1938

ELECTRONIC AIDS. A very general term that pertains to Navaids and excludes radar. Taylor refers to WW II-era forms and newer forms. For CAA the immediate context is Vortac.

References: CAA-FAP 1958, IFH 1971, Taylor 1958

ELECTRONIC LANDING AIDS. Overarching term. It lacks references to specific forms. The term refers to WW II and post WW II forms.
Reference: Kayton 1990

ELECTRONIC NAVIGATION AIDS. Overarching term. It lacks reference to specific forms. The term refers to World War II and post-war forms.
Reference: Kayton 1990

ELECTRONIC NAVIGATIONAL AIDS. A general term with few specifics. Radio Aids is a more common term though some terms use electronic instead.
References: ADS-Site 1971, 1973, 1980

GROUND AIDS. Main entry in General Overarching term. Cross-referenced because of association with Radio Aids.
Reference: IB 1953

GROUND-BASED NAVIGATION AIDS. A reference to 1920s era; similar in meaning to previous term.
Reference: Wilson 1979

GROUND-BASED RADIO AIDS. A reference to 1920s. Similar in meaning to previous term.
Reference: Wilson 1979

GROUND AIDS TO INSTRUMENT FLIGHT. Terms includes two forms:
 LANDING AREA RADIO NAVIGATIONAL AIDS
 ROUTE RADIO NAVIGATION AIDS
Reference: PICA0 1944

INSTRUMENT FLIGHT AIDS. US draft in PICA0 includes Radio Ranges, Radio Landing Aids and Direction Finding Facilities within this term.
Reference: PICA0 1944

NAVAIDS SYSTEMS. Radio Aids only (in publication) but it gives appearance

of more general term. Cross-reference here with main entry in General Overarching. Reference: DOT & AID, Aids ... SE Asia 1971

NAVIGATION SYSTEMS. A very general-appearing term that in fact refers to forms of Radio Aids with emphasis on present and developing forms. Reference: Olsen AI J/A 1991

PRIMARY NAVAIDS. One source uses the term in reference to Radio Range in 1950s. It denotes core En-route Aids though not an official term. It has the character of an overarching term. Reference: Wilson 1979

RADIO AIDS. An obviously overarching term though references are to events in 1930s. It may include voice and airborne equipment. Reference: Whitnah 1966

RADIO AIDS TO AIR NAVIGATION. This term includes: Aids to Final Approach & Landing, Short-Distance to Air Navigation, and Long-Distance to Air Navigation. The term then became Radio Navigation Aids. It was then altered to Radio Navigation Aids. Radionavigation returned only to be altered again to Radio Navigation Aids. Reference: AT 1949

RADIO AIDS TO NAVIGATION. A general term employed by a few sources. ITT refers specifically to TACAN but that source had a restricted scope. Reference: ITT, AD 1953

RADIO-BASED NAVIGATION SYSTEM. Seemingly an overarching term. It refers to newer forms of Radio Aids. Reference: Johns IJ 1997

RADIO LOCATION & APPROACH AIDS. Term without explanation. It may refer to en-route as well as to approach/landing aids. Reference: Young JN 1994

RADIO NAVAIDS. An overarching term. Seemingly restricted to actual Nav aids.
Reference: Blanchard JN 1990

RADIO NAVIGATION AIDS. A general term. For ICAO it can be applied to all forms as well as radar. It has a similar meaning for ATP. PHAK seemingly refers to Enroute Aids. For AIP the term is synonymous with Air Navigation Aids.
References: PHAK 1971, AT 1972, 1985, AIP 1991

RADIO NAVIGATIONAL AIDS/RADIO-NAVIGATIONAL AIDS. These terms can serve as general terms. For PICA0 it includes short and distance terms.
References: PICA0 1944, IB 1953, AIM 1973, Grover 1977

RADIO NAVIGATION/RADIONAVIGATION. A general term that is an OA term for some sources. Olsen refers to Nav aids and also to radar. Komons employs it as an OA term (voice communication is separate). Forssell includes enroute, approach and landing categories (second term).
References: Olsen, Glob Pol, AI 1991, Komons 1979, Forssell 1991

RADIONAVIGATION AIDS/RADIO-AIDS. In some editions of AT this term has the same meaning, components as Radio Navigation Aids.
References: AT 1958, 1960, 1963

RADIO NAVIGATION SYSTEM/RADIONAVIGATION SYSTEMS/RADIO-NAVIGATION SYSTEMS. The basic term (1st) has several meanings. For Olsen it is seemingly an OA terms for all Radio Nav aids. ITT refers to TACAN but that is a restricted use publication. IFH includes airborne self-contained systems, radar systems, ground/airborne systems. Forssell offers a second version which is OA. French includes an overarching term that is divided into space-based and ground-based forms.
References: Olsen AI 1991, ITT, IFH 1971, French 1996, Forssell 1991

RADIO NAVIGATION SERVICE. Adjoining terms include Nav aids, Air Navigation Radio Aids. Specific references to Air Navigation Aids and Radio Navigation Aids. Terms are perhaps interchangeable.
References: AIP 1991

RADIO-NAVIGATIONAL SYSTEMS. Term is interchangeable with Radio Aids; it also includes radar.

Reference: Grover 1957

3B2 Sub-Overarching Radio Terms.

General Note. These terms encompass two or more forms of Radio Aids. Terms for one form are attached to specific category (e.g., Landing terms are part of Terminal Aids).

LONG-DISTANCE AIDS. Term includes Consol, Loran and sometimes NDB.

References: AT 1963, 1965, 1972

LONG-DISTANCE AIDS TO NAVIGATION. It includes Consol, Loran, NDB.

Reference: AT 1949, 1963

LONG DISTANCE NAVIGATION AIDS/LONG-DISTANCE NAVIGATION AIDS. Several sources include the terms but with limited details.

References: IB 2nd ed 1955, AT 1958, AT 1996 (2nd)

LONG-DISTANCE RADIONAVIGATION AIDS. More explicit form of basic term of Long-Distance Aids.

References: AT 1958, 1963

LONG-RANGE NAVAIDS. Term not defined nor are examples given.

References: Aids... SE Asia, Olsen AI 1990

LONG RANGE RADIO NAVIGATIONAL AIDS. Terms refers to Aids in development in 1984. Possible entries: Navaglobe-Navarho, Dectra, Delrac.

References: IB 5th ed 1954

SHORT & LONG DISTANCE RADIO NAVIGATIONAL AIDS. Is this an actual term? It may be more on the order of a descriptive, lower-case name than actual title.

Reference: PICA0 1944

SHORT DISTANCE AIDS TO AIR NAVIGATION/SHORT-DISTANCE AIDS TO AIR NAVIGATION. AT Terms appear in "Attachments". They refer to terms involved in research, development and may not be fully operational. Aids include VHF Multi-track Pulse Range, GEE system. VOR is referred to as CW Omnirange. AT 1949 includes hyphen; 1958, 1963 does not.
References: AT 1949, 1958, 1963

SHORT DISTANCE AIDS/SHORT-DISTANCE AIDS. Term refers to VOR, DME. AT 1949 has a non-hyphen form; other editions included a hyphen.
References: multiple ICAO AT editions

SHORT-DISTANCE RADIO AIDS/SHORT DISTANCE RADIO AIDS. A variant form of previous term of a more explicit form.
References: AD 1949 (1st, 2nd), AT 1953 (2nd)

SHORT DISTANCE RADIO AIDS TO NAVIGATION/SHORT-DISTANCE RADIO AIDS TO NAVIGATION. A second variant form.
References: many editions of ICAO AT

SHORT RANGE NAVAIDS. Terms include VOR, VOR/DME, VORTAC, TACAN.
References: VOR 1986, Olsen AI 1990

SYSTEM OF APPROACH & LANDING. A term of a general descriptive nature. It is seemingly not a formal, technical term.
Reference: Keen 1938

WIRELESS AIDS. If the term is a noun would it thereby indicate an Aid? If a verb then it denotes the word aid as aiding, giving assistance.
Reference: Keen 1938

3B3 Special Terms

General Note. The terms in this segment are not Nav aids in themselves. Instead they refer to systems of navigation and related matters which employ Nav aids in one manner or another. Since they use a variety of types of Nav aids the terms are attached to General Overarching terms.

ATTITUDE HEADING REFERENCE SYSTEM (AHRS). Electronic system providing information on attitude. Is this an A/N? AIM lists it under Navigation Aids but it is fully contained within the aircraft and seemingly omits external Nav aid dimension
Reference: AIM 2004

AREA NAVIGATION. This navigation system employs an on-board computer that calculates courses drawing on signals from several sources that can include Doppler Navigation System, INS, Omega, Loran, GPS. ICAO (via Underdown) describes Area Navigation as a system operating on flight paths “within station-referenced navigation aids” or “self-contained aids” or both. Underwood notes it is a means of navigation which does not require flying over a point-source aid.
References: Taneja 1987, Underdown 1993

AREA NAVIGATION (RNAV)/AREA NAVIGATION (R-NAV). These variant forms include a widely employed acronym in two forms.
References: Forssell 1991, HR (2d)

AREA NAVIGATION SYSTEM. Systems is added to the basic term. The meaning is not changed.
Reference: Robson in Beck 1971

LONG DISTANCE RNAV/SHORT DISTANCE RNAV. HR divides RNAV into a short form (VOR, DME), and a long distance type (including INS, Omega, Loran, GPS). HR also refers to a variant known as RS3, RL1 and RL3. The first is for short distance operations including en route, terminal and approach categories. The second is long distance for en route operations. The final form is also long distance and can be employed for enroute, terminal, approach operations. HR also includes the specialized forms of STOL/RNAV and VOR/DME RNAV.
Reference: HR 1984

NONPRECISION RNAV. An Area Navigation system for approaches of a non-precision nature. It is predicated on VOR.

Reference: DOT/DOD FRP 1996

RNAV/RNAV SYSTEM. Acronym for Area Navigation.

References: FIR 1984, Taneja 1987, AIM 2004 (2nd term)

RNAV/FMS. This is seemingly a Flight Management System that includes integration of RNAV activities into a comprehensive and guidance system.

Reference: HR 1984

FAN/FANS. Acronym for Future Aviation Navigator Systems.

Reference: D. Olsen AI 11-92

FUTURE AVIATION NAVIGATION SYSTEM. ICAO created a committee under this name that formulated navigation systems for future use. The systems are to be largely based on satellite technology. The focus of the work is CNS (Communication, Navigation and Surveillance). ATM, Air Traffic Management, was also an interest of FANS. The systems provide an integrated system involving all aspects of air navigation including Nav aids. The terms, FAN and CNS, are nearly interchangeable in some of the literature. GPS is a prime component though FANS focussed on GNSS in which GPS is an element but not necessarily the entire system.

References: D Olsen AI 1990 and 1991, Jane Olsen AI 1993, Loh GPSW 1995

ATM. Acronym for Air Traffic Management. It has only limited significance for Nav aids in themselves though integrated systems encompass a variety of functions in a nearly seamless web.

Reference: Olsen AI 1991, 1993

ATM/CNS//CNS/ATM. Acronyms for Air Traffic Management and Communi ation, Navigation, Surveillance. This refers to a global system that integrates many functions including Nav aids.

References: Paylor 1994 (1st), Crow 2000 (2nd).

CNS. Acronym for Communication, Navigation, Surveillance.
Reference: Paylor 1994

COMMUNICATION, NAVIGATION, SURVEILLANCE. Integrated systems under development that encompass many aspects of air operations.
Reference: Olsen AI 1994

FLIGHT MANAGEMENT SYSTEM/(FLIGHT MANAGEMENT SYSTEM) (FMS). System that pre-programs routes. Accuracy updated by reference to conventional Nav aids.
References: AD 1999, Forssell 1991

INS. Acronym for Inertial Navigation Systems.
Reference: Loh 1994

INERTIAL NAVIGATION SYSTEM/INERTIAL NAVIGATION SYSTEMS (INS). Airborne system though not a Nav aid as such. It does not require external data. Inertial impact on airborne systems create data.
Reference: AIM 1999, AIM 2004

INERTIAL SYSTEMS/INERTIAL SYSTEMS (INS). Shorter form of basic term. Little information provided by source.
Reference: Forsell 1991

INTEGRATED GLOBAL SURVEILLANCE & GUIDANCE SYSTEM (IGSAGS). Proposal, concept for “next generation” CNS system. Ground stations direct needed information for navigation and other functions via satellites to aircraft. Possible replacement for GPS and WAAS and LAAS.
Reference: Crow IEEE 2000

3C Terminal Aids/Aids to Final Approach & Landing

3C1 General Terms

General Note. Older terms included here if their use continued into more recent times.

AIDS TO FINAL APPROACH. This refers to ILS. Not an general OA term.
Reference: At 1972

AIDS TO FINAL APPROACH & LANDING. Term is subdivision of Radio Navigation Aids. It includes ILS (1963) and MLS.
References: AT 1963, 1985

AIRCRAFT APPROACH & LANDING SYSTEMS. Overarching term for systems providing guidance in approaching runway and in landing.
Reference: Keen 1938

AIRCRAFT LANDING AIDS. An overarching term. It appears previously in these studies. A new source, Conway notes that it is a post-World War II term.
Reference: Conway 2006

FINAL APPROACH & LANDING AIDS

Classification #: 351

Form of Aid: Radio Aid to Navigation

Operation: Diverse patterned electronic impulses to receiving equipment provide aid for last part of flight.

Comments: Database employs a similar term: Aids to Final Approach & Landing
Term can conceivably include visual Aids though term suggests Radio Aids.

Reference: Part H, 2003

INSTRUMENT METHODS OF APPROACH & LANDING. A general term for a variety of systems involving equi-signal beams including NBS, Lorenz Thick Weather, Telefunken.

Reference: Keen 1938

LANDING AIDS. For Kayton this is a general term and nearly constitutes an overarching term. It includes ILS and MLS. Direction-finding Beacons, VOR, and Loran are included for non-precision approaches: direction-finding Beacons, VOR and Loran. Visual Aids and radar are also included. Library catalogues may include this as a category; see also Library of Congress.

Reference: Kayton 1990

LANDING AREA RADIO NAVIGATIONAL AIDS. Term encompasses the following term.

Reference: PICA0 1944

LANDING AREA SYSTEM OF RADIO NAVIGATION AIDS. Terms does not mention ILS but includes components of Localizer, Glide Path, Position Markers.

Reference: PICA0 1944

LANDING BEAM TRANSMITTER. Component of NBS System. See Also Dunmore Landing Beam.

Reference: Keen 1938

LANDING SYSTEMS. This term can have a broad meaning and may also be an overarching term. HR includes Radio Ranges, NDB, ILS, MLS. Olsen employs the term in an historic reference, but it can have a broader meaning. Taneja seemingly employs it as a synonym with Landing Aids which see.

Reference: Tanjea 1987, Olsen AI 1990, HR 1984

LATERAL NAVIGATION (LNAV)/LATERAL NAVIGATION/VERTICAL NAVIGATION (LNAV/VNAV). One source notes that LNAV is the new term for GPS non-precision approach. Lateral Navigation/Vertical Navigation (LNAV/VNAV) is described as similar to traditional approaches plus vertical guidance.

Reference: Free Flight Systems 2007

PRECISION APPROACH SYSTEM OTHER THAN ILS, GLS [GNSS LS),

MLS.

TRANSPONDER LANDING SYSTEM. On board systems give approach information, ground-based transponders and servers supply TLS queries.

SPECIAL INSTRUCTION APPROVED PROCEDURES. Procedures in place when published directives changed.

SPECIAL CATEGORY I DIFFERENTIAL GPS (SCAT-I DGPS). Aids gives differential corrections. Ground units include GPS receivers and VHF digital radio transmitters. Reviews satellite data received and transmitted by radio. Reference: AIM 2004

PRECISION LANDING SYSTEM. Term refers to ILS and MLS.

Reference: HR 1984

STANDARD NON-VISUAL AID. For ICAO this refers to ILS and MLS until January 1, 1998 when it would mean MLS only. Now a dated term.

Reference: ICAO AT 1985

STANDARD NON-VISUAL AID TO FINAL APPROACH & LANDING. This term refers to ILS.

Reference: AT 1963

TERMINAL NAVIGATIONAL AIDS (NAVAIDS). Term refers to facilities that provides electronic and/or visual aid in approaching airport for the purpose of landing. The term suggests a general overarching meaning; it is retained here because it suggests Radio Navaids including TVOR, ILS, COMLO, LTDA.

Reference: AIP 1973

TERMINAL NAVAIDS. Short version of previous term.

Reference: VGLS 1969, 1974

TVOR. Term appears in En-Route terms along with other VOR-related terms. This version refers to terminal usage.

Reference: AIM 2004

3C2 Historic Terms

General Note. Historic terms can refer to terms that were in use in the past and they can also include research, experimental and other terms that never reached an official status. This can create a welter of terms that is unwieldy and confusing. An attempt has been made to group non-standard terms in this section. There is admittedly a uncertain and incomplete aura about that attempt. Terms that became official are found elsewhere in the study.

AIR-TRACK SYSTEM. Civilian name for Y B System (Navy).

Reference: Conway 2006

A-1 (Hegenberger System). A-1 was the formal name for what was otherwise known as Hegenberger.

Reference: Conway 2006

APPROACH AID. It gives the appearance of an overarching term. The specific reference is to the Radio Compass as one form of Approach Aid.

Reference: Conway 2006

ARMY AIR FORCES INSTRUMENT APPROACH SYSTEM SIGNAL SET 51. In 1945 US Army began a new ILS version. It was operational at a higher frequency. It lessened static and provided a more straight course. In 1949 ICAO established that version for all members.

Reference: MOLA 2003

ARMY HEGENBERGER SYSTEM. Informal, descriptive name. Possibly an alternative name.

Reference: Conway 2006

AUTOMATIC COUPLER. Device that altered Localizer so signals could be sent to automatic pilot.

Reference: Conway 2006

BAUMAN & ETTINGER SYSTEM OF BLIND LANDING. Transmitter is in the plane rather than on the ground. Latitude and glide path messages are directed

from “ground receiving aerals.”

Reference: Keen 1938

BABS (BLIND APPROACH BEACON SYSTEM). A radar and ground person approach similar to Navy carrier Talk-Down System. Navy ground person and process is termed Landing Safety Enlisted (LSE).

Reference: Conway 2006

BEACON METHOD OF LANDINGS. A system involving airport control. That entity indicates the course to be taken. The Beacon in question is to be bi-lateral.

Reference: Keen 1938

BENT-BEAM-TYPE SYSTEM/LORENZ “BENT BEAM” SYSTEM. Two systems employing curved glide path process.

Reference: Conway 2006

BLIND BOMBING AID. Term refers to use of Localizer as an Aid for bombing activities.

Reference: Conway 2006

BLIND LANDING SYSTEM. Historic term of systems and research for safe landings during low visibility.

Reference: Conway 2006

BOWLES-MIT-SPERRY GYROSCOPE CONTINUOUS WAVE SYSTEM/ SPERRY CONTINUOUS WAVE SYSTEM. Experimental microwave system in early 1940s. It might have become operational but competing systems and exigencies of World War II sidelined the concept.

Reference: Conway 2006

BUREAU OF STANDARDS SYSTEM. Short form of US Bureau of Standards Blind Landing System. The system may appear under the heading of NBS.

Reference: Keen 1938

BOUNDARY BEACON/BOUNDARY MARKER. Components of NBS.

Reference: Keen 1938

CAA-MIT MICROWAVE LANDING SYSTEM. Refers to 1938 demonstration.
Reference: Conway 2006

CAA SYSTEM. Refers to microwave research project.
Reference: Conway 2006

COMMON LANDING AID. An agreed-upon system for military and civilian use in the 1940s.
Reference: Conway 2006

COURSE INDICATOR. Informal or descriptive term for Localizer?
Reference: MOLA 2003

D.F. LANDING. A term for an actual system? Keen speaks of “Other D.F. Landing Methods.” Apparently these methods are often modification of ZZ System. One specific approach is the Beacon Method of Landing.
Reference: Keen 1938

DUNMORE LANDING BEAM/DUNMORE ULTRA SHORT-WAVE LANDING BEAM. Alternate name for Landing Beam, a component of NBS System.
Reference: Keen 1938

EQUI-SIGNAL LOCALIZER. A 1929 Aid is so described. Possibly equi-signal is standard characteristic for Localizer at least for early forms.
Reference: Conway 2006

FORTY-CENTIMETER BLIND LANDING SYSTEM. Technical term for a form of Blind Landing System in an experimental or developmental state.
Reference: Conway 2006

MICROWAVE GLIDE PATH TERMS BEFORE 1945
General Note. Conway 2006 elaborates experimental and developmental ideas

for an early version of MLS. These terms refer to various versions of Glide Path.

EQUI SIGNAL GLIDE PATH

MICROWAVE GLIDE PATH TRANSMITTER

PULSED GLIDE PATH/PULSED GLIDE PATH SYSTEM

STRAIGHT-LINE GLIDE PATH/STRAIGHT-LINE GLIDE PATH
SYSTEM

TEN-CENTIMETER PULSED GLIDE PATH

TEN-CENTIMETER GLIDE PATH

330-MHZ GLIDE PATH

HEGENBERGER SYSTEM. Alternate name for US Army Air Corps Blind Landing System. Hegenberger was developer of the system in 1930s.

Reference: Keen 1938

INDIANAPOLIS SYSTEM. Reference to research into microwave aids. See also Standard System.

Reference: Conway 2006

LANDING-AID VERSION. Specific reference is to Loth System which see.

Reference: Conway 2006

LANDING BEAM. Older name for Glide Path.

Reference: MOLA 2003

LANDING-BEAM SYSTEM. An early terminal aid. Later known as Glide Path.

Reference: Pirath 1938

LANDING BEAM TRANSMITTER. Early term for what became known as Glide Path.

Reference: Conway 2006

LANDING SAFETY ENLISTED (LSE). See BABS.

LOCATOR STATION. Refers to physical plant which could consist of trucks.

Reference: Conway 2006

LORENZ SYSTEM. Short form of full title.
Reference: Keen 1938

LORENZ THICK WEATHER SYSTEM. System of the 1930s employing mf. It supplied azimuth guidance, vertical guidance and “distance-to-run information.” Components include main beacon, glide path, and marker beacons.
References: Kendal 1990, Keen 1938

LOTH SYSTEM/LEADER CABLE SYSTEM/DINGLEY LEADER CABLE SYSTEM/LEADER-CABLE-TYPE SYSTEM. Terms for a largely experimental idea consisting of buried cables that were to be electrified. Aircraft crews were supposed to be able to detect the cables. Both Point-to-Point Navigation and Landing Approaches were contemplated.
Reference: Conway 2006

LOW-FREQUENCY LOCALIZER. NBS low frequency Lorenz switched to UHF which had signals of higher quality.
Reference: Conway 2006

“LOW-TECH VHF SYSTEM.” Phrase refers to production of non-microwave system for navigation for World War II.
Reference: Conway 2006

MARCONI ULTRA-SHORT WAVE EQUI-SIGNAL APPROACH BEACON. Approach system involving equi-signal methods and Marker Beacons.
Reference: Keen 1938

MICROWAVE LOCALIZER. Part of 1930s/early 1940s attempt at MLS.
Reference: Conway 2006

MICROWAVE SYSTEM/MICROWAVE-BASED SYSTEM. General terms with reference to research efforts toward MLS in 1930s.
Reference: Conway 2006

NATIONAL BUREAU OF STANDARDS (NBS) TRIPARTITE SYSTEM. It refers to three systems: Localizer/Glide Path/Marker Beacon.
Reference: Conway 2006

NBS LANDING SYSTEM. Formal name or informal, descriptive name?
Reference: Conway 2006

NBS LOCALIZER SYSTEM. System was added. Indicates nature of Aid.
Reference: Conway 2006

NBS SYSTEM. Short name for U.S. Bureau of Standards Landing System.
Reference: Conway 2006

NBS-TYPE SYSTEMS. Presumably systems similar to NBS.
Reference: Conway 2006

NBS/YB. Not a joint system but instead a reference to shared shortcomings.
Reference: Conway 2006

PENETRATION METHOD OF LANDING. Method in which aircraft penetrates cloud barrier when safety followed by signals given by Direction Finding. Coded messages included.
Reference: Keen 1938

PILOT CONTROL MODEL/PILOT-CONTROL MODEL. Term from Conway for navigation methods in which pilot receives data in the cockpit and thereby has control of flight procedure. A ground-control procedure would be a marked contrast to pilot control.
Reference: Conway 2006

RAID-FORMING BEACONS. Term may refer to use of Compass Locator aiding formations of military aircraft flights returning to home bases.
Reference: Conway 2006

SHORT - AND MEDIUM-RANGE AIR NAVIGATION SYSTEM. Overarching

term for a broad range of navigation systems. It refers to World War II era.

Reference: Conway 2006

STANDARD BEAM APPROACH (SBA SYSTEM)/STANDARD BEAM APPROACH SYSTEM/SBA SYSTEMS. This is also listed, and described in En Route Aids.

Reference: Conway 2006

STANDARD SYSTEM. Term in this instance refers to early work on microwaves for airport approaches in 1930s.

Reference: Conway 2006

TALK-DOWN SYSTEM. See BABS.

“THREE-ELEMENT SYSTEM.” Proposal for Microwave System: Marker Beacon, Glide Path, Localizer.

Reference: Conway 2006

UHF CAA SYSTEM. Possible reference to CAA system following conventional radio systems rather than microwaves.

Reference: Conway 2006

UHF LOCALIZER. Part of United-Bendix, 1930s. Frequency was changed to UHF so it matched Glide Slope and reduced expenses by having one transmitter, receiver.

Reference: Conway 2006

UNITED-BENDIX SYSTEM.. A NBS descendent. Employed UHF for Localizer. United-Bendix viewed the system as ILS rather than BL (Blind Landing).

Reference: Conway 2006

US ARMY AIR CORPS BLIND LANDING SYSTEM. Historic system. Unlike NBS there was no central transmission. Instead airplanes utilized a radio compass while ground systems employed two NDB units accompanied by Marker Beacons. MF for NDBs and SWF for Marker Beacons.

Reference: Keen 1938

US BUREAU OF STANDARDS BLIND LANDING SYSTEM. Alternate name is NBS System System employed Runway Localizing Beacon accompanied by Main Beacon and Boundary Marker Beacon. Signals employed Ultra-Short Wave frequency. Signals created a landing beam for aircraft. Outer Marker included in a later version.

Reference: Keen 1938

US DEPARTMENT OF COMMERCE SYSTEM. Alternate name for US Bureau of Standards Blind Landing System.

Reference: Keen 1938

U.S.W. APPROACH BEACON. USW=Ultra Short Wave Beacons. They were employed in several systems including Lorenz and Marconi.

Reference: Keen 1938

WARNING SIGNALS/MARKER SIGNALS. These terms may constitute alternative terms for Marker Beacons. Keen refers to "1st Warning or Marker Signal." And "2nd Marker" equals Boundary Marker Signal.

Reference: Keen 1938

WIRELESS BEACON LANDING SYSTEM. Synonym for Landing-Beam System.

Reference: Pirath 1938

YB SYSTEM. US Navy version of ILS. A clone of NBS. A portable version.

Reference: Conway 2006

ZEPPELIN-TELEFUNKEN SYSTEM. Navigation system for dirigibles in 1930s.

Reference: Keen 1938

"ZZ" METHOD OF LANDING. ZZ denotes zero horizontal and vertical visibility. However, system not employed unless some visibility. Ground-generated coded messages given to aircraft until landing signal is given by

generated coded messages given to aircraft until landing signal is given by Ground DF unit. Signal gives code for ZZ.

Reference: Keen 1938

3C3 Instrument Landing Systems, ILS

a) Principal Terms

General Note I. This integrated system of Navaids includes various permutations of the core term. The acronym is employed more often than the word form. The word form followed by acronym will be the basic term in this coverage. Full name without acronym is often used by older sources. Some use is made of acronym followed by word form.

General Note II. ILS includes instrument-assisted navigation which includes Radio Aids and aircraft-based receivers. However, Visual Aids are sometimes included within ILS. This is true of ALP and AIM publications. Some older sources seemingly refer exclusively to visual forms. Those forms are not included here.

INSTRUMENT LANDING SYSTEMS, ILS. This system creates a path for approach aircraft. Information for alignment and descent is provided for the final approach. ILS can be traced to the 1930s. US Army Signal Corps experimented and developed what became known as SCS-51. A modified version was adopted by ICAO in 1948. There are three components: Localizer, Glideslope (or Glide-path), and Marker Beacons. The localizer provides an azimuth function that give horizontal guidance. The Glideslope provides vertical guidance on the descent path. Two or three Marker Beacons provide radio checks during descent.

References: Underdown 1993, Taneja 1987, Williams 1992, AIM 1999, AIP 1999

Classification #: 3510

Form of Aid: Radio Aid to Navigation.

Operation: Multi-faceted system providing assistance in landing operations.

Comments: See introduction to entry

ILS. Acronym for Instrument Landing System. Employed more often than word version.

References: Bauss 1963, Daly FI 1994, Casabona 1959, Williams 1992

INSTRUMENT LANDING SYSTEM (ILS)/INSTRUMENT LANDING SYSTEM/ILS, INSTRUMENT LANDING SYSTEM. Variant forms of the basic term includes word forms followed by acronym, and acronym followed by word forms.

References: include IB Aero 1953, Tugs AI 1985, ADS-Site 1980, AT (3rd term)

INSTRUMENT-LANDING SYSTEM. Two sources provide a hyphenated version conjoining instrument and landing; the meaning is unchanged.

References: Poritsky 1950, Daly FI 1994

I.L.S. (INSTRUMENT LANDING SYSTEM). A single and nearly historic source offers a punctuated form of the acronym.

Reference: Smith 1948

b) Other Terms

FAA INSTRUMENT LANDING SYSTEMS. Specific reference is to written and visual description of the systems including all componets.

Reference: AIM 2004

INSTRUMENT LOW-APPROACH (ILS)/INSTRUMENT LOW APPROACH SYSTEM. Casabona (Heaney) translated ILS as Instrument Low-approach System. It contained the same components of Localizer, Glide Slope, and Marker Beacons.

Reference: Casabona 1959, Conway 2006 (2nd term)

FIXED-BEAM LOW-APPROACH SYSTEM. A term for this category of Aids which includes the Instrument Low-Approach System. Seemingly no other system is included in the category.

Reference: Casabona 1959

(ILS)/DME

ILS/DME

(LOC)/DME

LOC/DME

LDME

VOR/DISTANCE MEASURING EQUIPMENT.

Colocated devices identified by radio code that gives specific identification of the part of the installation of interest to navigator. The basis of the operation is on a time share arrangement.

Reference: AIM 2004

ILS 381. Possibly a reference to a manufacturer's (Thomson-CSF) name/model number.

Reference: Tugs AI 1985

INSTRUMENT LANDING DEVICES. Name of RTCA Subcommittee, 1936.

Reference: Conway 2006

LOCALIZER-TYPE DIRECTIONAL AID (LDA). Similar to Localizer but not part of an ILS.

References: AIP 1999, AIM 2004

SCS-51/ILS. Systems conjoined in 1945 in some circumstances. AAF employed SCS-51 for mobile units while ILS employed for fixed installations.

Reference: Conway 2006

SIMPLIFIED DIRECTIONAL FACILITY (SDF). Term for device that offers final approach information similar to ILS Localizer. But lacks glide slope information.

Reference: AIP 1999, AIM 2004

Various levels (categories) of aviation require specific levels of performance. A variety of ILS terms are attached to one of these categories. The functioning of the system remains essentially unchanged. These terms include:

CAT I INSTRUMENT LANDING SYSTEM.

Reference: Johns LI 1997

CATEGORY II ILS.

Reference: AIM 2004

ILS CAT II/III.

Reference: DOT/DOD FRP 1996

ILS CAT II.

Reference: Tugs AI 1985

CAT II/III ILS.

Reference: Short Takes AI 1992 b)

CAT III, ILS.

Reference: Glines 1989, Sutton IA 1993

CAT III ILS.

Reference: Daly FI 1994

c) Constituent Elements

1) Component Terms

General Note. The coverage of general ILS terms includes names of component parts and brief description of their functions. This coverage lists principal and variant terms for these components. Notes will be selective according to the need for explanations.

COMPASS LOCATOR. This Aid is a NDB operating with ILS Markers.

References: AIM 1973, NOTAMS 1993

COMPASS LOCATOR STATION. Fuller or alternative version of basic term for 1930s Aid.

Reference: Conway 2006.

GLIDE SLOPE. An Aid providing guidance path (angle of descent) which consists of radio impulses. Transmitter provides UHF path above the runway.
Reference: Flight 1971, AIP 1991, Casabona 1959, Crew 2000

GLIDE SLOPE RADIO COURSE. Term has the meaning of Glide Slope. This may be less an official name than a descriptive term. Vertical guidance is given along descent angle.
References: NOTAMS 1993, Taneja 1987, Olsen AI 1990

GLIDE SLOPE/GLIDE PATH. At times Glide Path seems to be a synonym for Glide Slope. For AIP Glide Path is that portion of the Glide Slope which “intersects the localizer.” Possibly the meaning of Glide Slope in that context refers more to the signal than the physical apparatus.
Reference: AIM 1991, AIP 1999

GLIDE SLOPE FACILITY. Seemingly this refers to transmitter and its emissions. Glide Slope, the core term, may be a shorter term with same meaning.
Reference: DOT/DOD FRP 1994

GLIDE SLOPE (GS) FACILITY. Variant of previous term with acronym.
Reference: NavFacEngCom 1987

GLIDESLOPE. AIM 2004 has the term as one word.
Reference: AIM 2004

GLIDE SLOPE SYSTEM/GLIDE-SLOPE SYSTEM. Variant form that makes explicit the systems character of the Aid.
Reference: Cook AW 1960, Olsen AI 1993-1

GLIDE PATH. Grover refers to Glide Path TX (TX=track)
References: Whitnah 1966, L & M 1947, Grover 1957

GLIDE-PATH (GP). Casabona offers a hyphenated version of the basic term.

ILS GLIDEPATH TRANSMITTER. Term refers more to physical apparatus than signals emitted.

Reference: Underdown 1993

ILS GLIDESCOPE. Often Glide Slope constituents two words. This source views them as one word; ILS then added to basic term.

Reference: Hundley & Rowson 1993

NULL-TYPE GLIDE SLOPE/NULL-REFERENCE (NR) GLIDE SLOPE. A simple glide slope employing two antennas. Employed at sites where site or other challenges are lacking.

Other Glide Slope antenna systems include:

SIDEBAND REFERENCE (SBR) IMAGE SYSTEM

CAPTURE EFFECT (CE) IMAGE SYSTEM

BASIC SYSTEM

UPSLOPE END-FIRE SYSTEM

References: Casabona 1959 (1st term), Maint. ... 1986.

STRAIGHT-LINE GLIDE PATH. Term refers to developmental, experimental system.

Reference: CAA L & M 1947

ILS GLIDE SLOPE. ILS added to core term thereby identifying the system that contains Glide Slope.

Reference: Kleiber 1984

ILS GLIDE SLOPE SUBSYSTEM. FRP refers to Glide Slope as subsystem; possibly viewed in context of ILS in which Glide Slope is a component.

Reference: DOT/DOD FRP 1999

TWO-FREQUENCY GLIDE PATH SYSTEM. A system that creates coverage by broadcasting on two frequencies within one glidepath.

Reference: Lexicon 1985

UHF GLIDE SLOPE TRANSMITTER/UHF GLIDE SLOPE. Term refers to physical apparatus. Second term omits transmitter
Reference: AIM 1991, Conway 2006

ILS GLIDE PATH TRANSMITTER. Term refers to physical apparatus.
Reference: AIM 1991

ILS GLIDE PATH. Some sources add ILS to basic term thereby indicating system to which Glide Path belongs.
Reference: Williams 1992

LOCALIZER UNIT (LO). Casabona refers to Localizer as a Localizer Unit but seemingly identical to core term of Localizer.
Reference: Casabona 1959

LOCALIZER. A basic component of ILS. The Localizer provides lateral guidance (course guidance for runway).
Reference: Casabona 1959, Forssell 1991

WIDE-APERTURE LOCALIZER. A nearly historic term. This form replaced an earlier version. Presumably Localizer in source refers to contemporary version.
Reference: Casabona 1959

ILS LOCALIZER. Some sources add system to the basic thereby indicating what entity the aid is attached to. This is true for several surveyed references.
Reference: Kleiber EC 1984, H & R 1984

OFFSET LOCALIZER. This Localizer is off to one side of runway in contrast to regular position in which Localizer is aligned with runway centerline.
Reference: Grover 1957, VGLS 1969, 1974

TWO-FREQUENCY LOCALIZER SYSTEM. A Localizer that broadcasts on two frequencies creating a single coverage.
Reference: Lexicon 1985

LOCALIZER FACILITY. Addition of word facility to basic term denotes physical apparatus.

Reference: DOT/DOD FRP 1994

MARKER BEACONS. These Beacons when within ILS are a component that provides ranging information. They emit cone or fan-shaped signals which denotes location in the ILS approach path.

There are several forms:

OUTER MARKER/MIDDLE MARKER/INNER MARKERS.

In addition there are:

LOCATOR MIDDLE MARKERS/OUTER MIDDLE MARKERS.

Acronyms include:

IM, OM, MM, LOM, LMM.

References: IFH 1971, NOTAMS, Field 1985

ILS MIDDLE MARKER BEACON/ILS INNER MARKER BEACON. ICAO provides a fuller title for two forms of Marker Beacons.

Reference: 2nd Air IB 1955

OUTER MARKER COMPASS LOCATOR/MIDDLE MARKER COMPASS LOCATOR. Terms refer to Compass Locators at Outer and Middle Markers.

Reference: AIM 1973

ILS MARKERS. 75-mc. Marker Transmits pattern in a fan-shaped designs. It indicates distance along approach path. And includes Outer Marker and Middle Markers. Also called Fan Marker. Alternate name: Marker Beacon.

Reference: Poritsky 1959

ILS-ASSOCIATED FAN MARKER (FM). Also known as a Marker Beacon (MB). There are three types: Outer Marker, Middle Marker, and Inner Marker.

Reference: Maint of Airp Vis Aid Fac 1986

‘SLASHER.’ Possibly colloquial term for Compass Locator Station.

Reference: Conway 2006

SOLID-STATE MARKERS. ILS Marker equipment can take several forms. This form is housed in an enclosed shelter that can be transported in some cases. Other forms involve pole-mounted, and more permanent shelters.

Reference: Siting 1985

POLE-MOUNTED MARKERS. Newer forms of ILS Marker Equipment that employ less permanent and substantial forms.

Reference: Siting 1985

75 MHz ILS MARKERS. General heading for treatment in source. Includes ILS Markers (ILS-Associated Fan Markers (FM) and Marker Beacons). The workings of the Markers is considered under a heading of Fan Marker Ground-Based Systems.

Reference: Maint. ... 1986

VHF MARKER BEACON. This term or a similar one is also included in the inter-category. This specific version refers to ILS Outer Marker and Middle Marker.

Reference: Taneja 1987

BACK COURSE MARKERS. Markers are sometimes established on back course approaches in order to gain enhanced use of localizer. These Markers may be ILS Markers, Fan Markers or Lower-Power Fan Markers. Messages are steady tone, 3000 Hz accompanied by two dots (72) or tube-type equipment (95 with solid state equipment).

Reference: Siting 1985

BACK COURSE MARKER BEACON. Fuller form of basic term.

Reference: ADS-GA 1969

2) Early Terms: Conway 2006

COMPASS LOCATOR STATION. Specific reference to a World War II version referred to as the "Slasher."

CONSTANT-INTENSITY GLIDE PATH. It is not entirely clear if this refers to equipment or to a path. It refers to NBS system.

EQUI-SIGNAL LOCALIZER. Specific reference to Localizer in the 1920s and to the indicator that received the signals from it.

LOCATOR STATION. An overarching term. Specific reference to an early version in the 1930s.

LOW-FREQUENCY LOCALIZER. Reference to early forms.

NBS LOCALIZER. Reference to NBS research and development programs.

UHF GLIDE SLOPE. Transmitter added in liv. Part of existing system?.

UHF LOCALIZER. An element of an early MLS system that combined a microwave glide path with a UHF Localizer.

3C4 Microwave Landing Systems, MLS

General Note. MLS is a newer system for landing approaches and was intended to replace ILS. It constitutes a smaller body of terms than ILS. Word forms are more common in usage than acronyms in contrast to ILS. Possibly its newer status required use of full names because of unfamiliarity. This coverage is divided into major terms, and constituent and other terms.

a) Principal Terms

MICROWAVE LANDING SYSTEM (MLS)/MICROWAVE LANDING SYSTEM, MLS/MICROWAVE LANDING SYSTEM. The word form of MLS followed by the acronym is the most common. MLS gains its name from the frequency it employs: 5 GHz microwave band. This frequency reduces the problem of multipath. ILS is affected by multipath thereby reducing the quality of signals. That problem is generated by terrain and weather conditions. MLS has

more channels and a higher quality signal. MLS components include the azimuth station which is akin to ILS localizer. The station determines the aircraft's angle of approach. The elevation station is similar to ILS glide slope. The future of MLS has been truncated by the use of GPS and DGPS. And MLS may actually end before ILS.

References: AIM 1999, Forssell 1991, Dodington EC 1984, AT 1996 (R)

Classification #: 3510

Form of Device: Radio Aid to Navigation

Operation: Multi-faceted system that assists in landing operations.

Comments: See introduction to entry

MLS. Acronym for Microwave Landing System. Unlike some acronyms it is less employed than the word form.

References: Reynish ATW 1994, Sutton IA 1994, Pilling AI 1994

MLS System. A short form that is often employed though system in title is less common.

Reference: Clausing 1987

MICROWAVE SYSTEM. Perhaps overly inclusive, vague for MLS. But employed by source and workable within Aero Navaid context.

Reference: MOLA 2003

(MICROWAVE LANDING SYSTEM) (MLS). Word form followed by acronym. One source places both within paranthesis.

Reference: Forssell 1991

STANDARD MLS. Condom speaks of this form as having four elements (Azimuth Unit, Elevation Unit, Precision DME, Back-azimuth Unit).

Reference: Condom IA 1985

b) MLS Constituent and Other Terms

DEPARTURE SYSTEM. German firm of SEL views MLS as both landing and

departure system.

Reference: Olsen AI 1990

DUPLEX MLS. An earlier MLS from Condom. No explanation given.

Reference: Condom IA 1985

TACTICAL MLS STATION. Military version of a portable nature.

Reference: Clausing 1987

INTERIM STANDARD MICROWAVE LANDING SYSTEM/INTERIM-STANDARD MICROWAVE LANDING SYSTEM (ISMLS)/INTERIM MICROWAVE LANDING SYSTEM (ISMLS)/ISMLS. These various terms suggest an early form that was provisional in nature.

References: IFH 1971 (1st), ATP 1991 (2nd), AIM 1991 (3rd), HR 1984 (4th)

MLS/RNAV. This reference is primarily to aircraft based equipment. The level of operation goes beyond basic receiver and includes computer technology allowing selection of airport other than nearby field.

Reference: Glines 1989

MLS PRECISION DISTANCE MEASURING EQUIPMENT. This form operates in the same way as the standard form. However, the frequency is different and it can be activated by aircraft.

Reference: AIP 1999

DOPPLER MLS. A form of MLS that adopts the Doppler principle.

Reference: Forssell 1991

TIME REFERENCE SCANNING-BEAM SYSTEM. A MLS that uses "to-fro" measurements. Transmissions emit fan beam that scans the operational area. Each scanning provides pulse that can be received in the aircraft. The time difference between "to" scan and "fro" scan denotes direction.

Reference: Forssell 1991

SCANNING BEAM MLS. Variant name for Time Reference Scanning-Beam

System.

Reference: HR 1984

SCAMLS. Acronym for Scanning Beam MLS, TRSB.

Reference: HR 1984

STOL/MLS. MLS adapted to STOL Port operations.

Reference: HR 1984

The components of MLS include:

AZIMUTH STATION.

Reference: AIP 1999

ELEVATION STATION.

Reference: AIP 1999

MLS AZIMUTH/MLS AZIMUTH STATION.

References: MLS AI 1984 (1st), Tugs (2nd)

MLS AZIMUTH EQUIPMENT.

Reference: Charnley JN 1985

MLS GROUND STATION.

Reference: Tugs AI 1985

MLS ELEVATION EQUIPMENT.

Reference: Charnley JN 1985

There are a series of terms referring to applications of MLS to categories of aviation operation. References in all cases is Pilling 1994. The terms include:

CAT I MLS

CAT II MLS

CAT III MLS

CAT II MOBILE MLS (MMLS)
CAT I/II/III MLS

c) MLS Systems & Constituent Terms: 1930s/1940s

General Note: Conway 2006 includes coverage of early microwave work before the current ILS was fully operational. These terms are closer in appearance to ILS terms than current MLS terms

CAA-MIT MICROWAVE LANDING SYSTEM. A 1938 demonstration model.

INDIANAPOLIS SYSTEM. Term for early work on MLS. See also Standard System.

Terms resemble ILS forms rather than contemporary MLS:

MICROWAVE LOCALIZER/MICROWAVE GLIDE PATH

General terms for early systems:

MICROWAVE-BASED SYSTEMS
MICROWAVE SYSTEMS

STANDARD SYSTEM. Refers to early work on microwave approach system in 1930s.

Earlier systems included CW and Pulsed Glide Path forms:

TEN-CENTIMETER CONTINUOUS WAVE (CW) MICROWAVE SYSTEM/
TEN-CENTIMETER PULSED GLIDE PATH (PG). Neither system came to fully development in contrast to ILS development.

THREE-ELEMENT SYSTEM. Proposal for a microwave system with marker beacon, glide path and localizer.

3D En-Route Aids

EN-ROUTE AIDS/SHORT-DISTANCE EN ROUTE AIDS. This term serves as an overarching term for all Radio Aids other than Terminal Aids. However, there is little use of it in the literature. One article on MLS includes the term in a partial sense. AIP includes Radio Navigational Aids-En Route which is closer in meaning. One other source speaks of Short-Distance En Route Aids.

References: MLS AI 1984, AT 1999, Casabona 1959

EN-ROUTE SHORT-DISTANCE AIDS

Classification #: 352

Form of Device: Radio Aids to Navigation

Operation: Emission of electronic impulses by diverse Aids for en-route navigation other than long-distance.

Comments: Database includes En-Route Aids and refers to Short-Distance En-Route Aids. But this term added only in 2nd ed.

Reference: Part H, 2003

3D1 Historic Terms

a) Early Terms

BEACON TRANSMITTERS FOR FIXED COURSE & LONG-RANGE NAVIGATION. Term encompassing radio transmitters used in navigation.

Reference: Keen 1938

RADIOBEACON SERVICE. System for providing radio assistance for aero and maritime navigation.

Reference: Keen 1938

BEACON TRANSMITTING STATIONS. Term includes two classes: Navigational Beacons, and Fixed Course Beacons which see.

Reference: Keen 1938

NAVIGATIONAL BEACONS. Transmitting Beacons include 2 classes: 1) Navigational Beacons (which “Fixed Non-Directive Marine Beacon” and “Rotating Directive Beacon”) and 2) Fixed Course Beacons.
Reference: Keen 1938

TELEFUNKEN COMPASS/TELEFUNKEN ROTATING BEACON. A form of Rotating Beacon began in about 1917-18 (1st term). VOR represents a much later development.
Reference: Kendal JN 1990

THE COURSE SETTER/EQUI-SIGNAL COURSE SETTER, 1907. A Lorenz installation with two single individual aerials emitting A to N messages. A steady tone denoted on course; A indicated off course.
Reference: Kendal JN 1990

FIXED COURSE BEACONS. A category that included Directive Beacons. That category included Equi-Signal Beacons which included Radio Ranges.
Reference: Keen 1938

SCHELLER COURSE SETTER SYSTEM. Inventor’s name attached to the basic term. Predecessor of Lorenz system, SBA systems and finally ILS.
Reference: Kendal JN 1990

EQUI-SIGNAL BEACON. Term in Keen for major form of Directive Beacon. Many were employed in Radio Ranges.
Reference: Keen 1938

THE WIRELESS LIGHTHOUSE. A Marconi invention work that resulted in an early Marine Radio Beacon; it was also employed by aircraft. It operated on VHF and radiated signals that navigators used to determine bearing.
Reference: Kendal JN 1990

STANDARD BEAM APPROACH (SBA). Further development of course setter resulted in landing approach system, azimuth guidance, vertical guidance. “Distance-to-run” data supplied by Marker Beacon. Superseded by ILS.

Reference: Kendal JN 1990

LORENZ AZIMUTH GUIDANCE BEACON. This Aid is a predecessor of SBA, and descendent of Course Setter.

Reference: Kendal JN 1990

SMALL LOOP AERIAL SYSTEM.. Term indicates early experiments of producing figure-of-eight transmission pattern. Applied to airborne D/F system.

Reference: Kendal JN 1990

BELLINI TOSI SYSTEM/BELLINI-TOSI SYSTEM/BELLINI TOSI D/F SYSTEM.. Early system employing a method producing figure of eight pattern. Also known as Bellini Tosi D/F system. The transmitting dimension is the MF Radio Range.

Reference: Kendal JN 1990/Keen 1938 (3rd term)

TWO COURSE BEACON/FOUR COURSE BEACON. US Dept of Commerce carried out experiments on these forms. Further research efforts led to VOR.

Reference: Kendal JN 1990

b) Intermediate Terms

RADIO RANGE/RADIO-RANGE. A now (seemingly) obsolete form of Navaid. Radio Range transmitted double “figure-eight” pattern of signals. The signals, in dots and dashes, emitted letter of “A” and “N”. When on course or on the beam the signals merged and created a “T” but an A or N when off course. The Radio Range also emitted a identification signal for each station. The signal was approximately 3-10 miles wide and about 100 miles in length. Before VOR this was the primary Aid for navigation. The hyphenated form is an alternative formulation.

Reference: Whitnah 1966 (1st, 2nd), Solberg 1979 (1st), Kendal JN 1990 (1st)

Radio Ranges could take one of several formulations. The primary form might be termed classical since its symmetrical appearance appears in many sources.

However, Keen 1938 includes a variety forms. They include:

SYMMETRICAL FOUR-COURSE EQUI-SIGNAL BEACON. This is seemingly the basic form of the Radio Range.

UNSYMMETRICAL FOUR-COURSE BEACON. Some Ranges were asymmetrical since they interacted with Ranges at other airports.

DOUBLE MODULATION SYSTEM. A version in which the steady note frequencies (2) replaced the A/N keyed signal.

FOUR-COURSE DOUBLE MODULATION BEACON. A fuller name for the previous range or a modification of it?

TRIPLE MODULATION 12-COURSE EQUI-SIGNAL BEACON. A complex version that Keen describes in the following manner: "... each course being indicated by a different combination of reeds in a most ingenious indicator, with four vibrating reeds and a colour code that corresponded to the various courses."

RADIO RANGE BEACON/RADIO-RANGE BEACON. Terms refer to transmitter in the Radio Range System.

References: Whitnah 1966 (1st), Komons 1978 (2nd), Kendal JN 1990 (1st)

RADIO MARKER/RADIO MARKER BEACON/RADIO-MARKER BEACON. This Aid was a second system in the early days of aviation. It denoted the location of each Radio Range thereby permitting aviators to determine position. Whitnah notes the supplying of weather information by Radio Markers.

Reference: Komons 1978, Whitnah 1966

RADIO NAVIGATION BEACON. Term for Radio Range in 1926.

Reference: Conway 2006

RADIO RANGE EQUI-SIGNAL BEACON SYSTEM. Medium Frequency device employed for en-route navigation. Keen has a fuller term for it.

Reference: Keen 1938

RADIO RANGE STATION/RADIO STATION. Radio Range Station may have identical meaning to that of Radio Range though it may have a somewhat larger meaning. It included the physical plant component of an airway system and not just the transmitted signal. Term may refer to Radio Range as well though it can

have a separate meaning of weather station. Solberg and Finch use the shorter term which refers to Radio Range. Komons uses the second term as radio station for weather information.

References: Komons 1978 (2nd), Wilson 1979 (1st), Finch 1938 (1st)

RADIO RANGE STATIONS--CLASSES. These stations transmit directional messages and can be divided into classes including:

CAA MRA RANGE. They employ Adcock, vertical radiators. Also known as ADCOCK RANGE.

CAA MRL RANGE. They employ loop radiators. Other names include: LOOP TYPE RANGE, LOOP RANGE.

References: Breniman 1970, Henney 1959

RANGE. Terms refers to Radio Range.

Reference: Komons 1978

AIRCARDI SYSTEM. A historic term. A form of Rotating Beacon. And seemingly an Radio Range with equi-signal. Keen notes "that the directive radiation rotates--or rather oscillates--to and fro through an arc of a circle."

Reference: Keen 1938

AURAL RADIO RANGE. Aural form under development in late 1920s. Work on a visual-type Beacon also in development.

Reference: Komons 1978

AURAL RANGE. Signal (in Morse Code) received for Four-Course Range.

Reference: Conway 2006

AURAL-TYPE RADIO-RANGE BEACON. This refers to a form that is received through ear phones.

Reference: Whitnah 1966

DIRECTIVE BEACON. Keen includes a category known as Fixed Course Beacons. Directive Beacons are a major component. Equi-Signal Beacons constitute a major portion of Directive Beacons. Radio Ranges in turn are

significant Equi-Signal Beacons.

Reference: Keen 1938

LOTH SYSTEM OF ROTATING BEACONS/LOTH SYSTEM OF TWIN ROTATING BEACON. This is apparently an equi-signal device and therefore a Radio Range. Intersecting signals from two Beacons indicate course (or off-course) position.

Reference: Keen 1938

Radio Ranges by Frequency:

General Note. A variety of Radio Ranges incorporated frequency in the title.

These include the following terms with added selective notes.

LOW/MEDIUM FREQUENCY RADIO RANGE. There are two forms according to antenna system: Loop range, and Adcock Range. Possibly obsolete by 1970s.

Reference: AIM 1973

LOW/MEDIUM FREQUENCY RADIO RANGE (LLFR)

Reference: Interagency 1967

LOW OR MEDIUM FREQUENCY RADIO BEACON.

Reference: AIP

LOW OR MEDIUM-FREQUENCY RADIO RANGE.

Reference: PICA0 1944

LOW AND MEDIUM FREQUENCY RADIO RANGE.

Reference: Poritsky 1959

LOW-FREQUENCY FOUR-COURSE RANGE. Range often listed as LF/MF but Wilson specifies LF here. The Radio Range was four-course though often that is omitted from title though not in this instance.

Reference: Wilson 1979

LOW-FREQUENCY RADIO RANGES. Another name for Low/Medium

Frequency Radio Range. Contradiction not explained.

Reference: AIM 1973

LOW/MEDIUM FREQUENCY (L/MF) RADIO RANGE. Seemingly obsolete before 1973 yet listed in AIM. Terms refer to two forms of Low-Frequency (not L/MF) Radio Ranges: Loop Range and Adcock Range.

Reference: AIM 1973

LOW FREQUENCY RANGE. This is presumably a shorter form of the full term, Low-Frequency Radio Range.

Reference: FAA Flight 1971

FOUR-COURSE RADIO RANGE. An early Aid that lasted into comparatively recent times. It consisted of two antenna loops that created double figure eights. One figure emitted Morse Code character A (dot-dash); the second an N. When on course the air crew received a steady signal (long dash) and an A or N when off course or off the beam.

Reference: Komons 1978, Kayton 1990, Solberg 1979

FOUR-COURSE RADIO STATION.

Reference: Taneja 1987

FOUR-COURSE RANGE. Short form of Four-Course Radio Range.

Reference: Komons 1978, Taneja 1987

FOUR-COURSE TYPE. Variant term for Radio Range.

Reference: Conway 2006

ROTATING RANGE. This term is a colloquialism. Named by pilots because ranges not stable and tended to vary by several degrees.

Reference: Conway 2006

VISUAL RANGE. Radio Range that produced signals appearing on an instrument. See also: Aural Range.

Reference: Conway 2006

3D2 VOR, VORTAC, DME & TACAN Forms

General Note. VOR, DME, TACAN and related Aids have served as the primary short-range Navaid for a half-century. These Aids have been employed in North America, and other regions. The advent of GPS is eclipsing their importance though they remain in use. This segment surveys the subject matter under headings of VOR, DME, TACAN, and composite forms. There are some Terminal Navaids use of these Aids which will be noted here and in Terminal Aids.

a) VOR, VHF Omnidirectional Radio Range

General Note. VOR, as well as other Aero Navaids, are frequently better known by an acronym than by a word title. VOR can stand for several versions of that term including VHF Omnidirectional Radio Range. VHF is infrequently spelled out: Very High Frequency. Some terms include radio range and others range only. Omnidirectional can be one word or it can be hyphenated. VOR may precede or it may follow the written form even though VOR alone is often the title. This study will use VOR followed by the written form as the primary term.

Classification #: 3520

Form of Device: Radio Aid to Navigation

Operation: Aid provides bearing data in all directions.

General Note: See General Note above.

References: DOT/DOD FRP 1996, Cannes 1997, VOR/DME & VORTAC 1986

VISUAL OMNI-RANGE (VOR). Conway references to this term rather than usual VHF Omni-Range. No explanation was included for the difference.

IRE includes a possibly related Aid:

VISUAL RADIO RANGE. Messages are via visual instruments not aural transmissions.

Casabona includes a integrated AID termed

VISUAL-AURAL TWO-COURSE RADIO RANGE (VAR). This exhibited two forms of messages. It was an interim Aid and was viewed as replacement for the older Four-Course M-F Radio Range.

Reference: Conway 2006, IRE 1949, Casabona 1949

OMNIDIRECTIONAL RANGE. Specific reference is the Visual Omni-Range.
Reference: Conway 2006

VOR. A radio navigation system that replaced Radio Ranges. It provides bearing (azimuth) data in all directions. It is primarily a short-distance Navaid though some terminal forms are in use. Cannes notes that there are three forms: Terminal, (25 nm and 18,000 and lower; Low altitude; 40 nm and 13000' and lower; High altitude, 100 nm for 14,500' altitude to 17,999' and 130 nm, 18000' to 40000'. Many VORs are collocated with DME or TACAN units.
Reference: DOT/DOD FRP 1996, Cannes 1997, VOR/DME & VORTAC 1986

VOR-BASED SYSTEM. Specific reference of term is to VOR. VOR has meaning of Visual Omni-Range for source.
Reference: Conway 2006

VHF OMNIRANGE (VOR). A variant form of the term that encapsulates the core features: VHF with an omnidirectional range.
References: Wilson 1979, AIM 1973

VHF OMNIDIRECTIONAL RADIO RANGE. This may constitute the basic and complete form of the term though it lacks the acronym. Omnidirectional is one word rather than two words in a hyphenated form.
Reference: Solberg 1979

VHF OMNI-DIRECTIONAL RADIO RANGE (VOR). A slightly variant form of basic term.
References: AIP 1991, IFH 1971, AT 1985, 1996

VHF OMNI-DIRECTIONAL RADIO RANGE. A similar form but without the acronym.
Reference: AT 1968

VHF OMNIDIRECTIONAL RANGE (VOR). Alternate form that omits Radio from the title. But it remains the same Aid.

References: Kayton 1990, Flight 1971

VHF OMNI-DIRECTIONAL RANGE (VOR). A variation on the previous term save that Omni and Directional are two words in hyphenated form.

Reference: AIP 1999

VERY HIGH FREQUENCY OMNIRANGE (VOR). An infrequently employed form that spells out VHF.

Reference: ADS-GA 1969

VOR (VHF OMNI-RANGE). Many terms end with an acronym. However, this one begins with the acronym.

Reference: AT 1949

VOR (VHF OMNIDIRECTIONAL RADIO RANGE). This version of the basic term begins with acronym. It is a fuller form in that radio is added to range.

Reference: AT 1958

CONVENTIONAL VOR. It is questionable whether this constitutes a term. The source differentiates between Conventional VOR and the Doppler VOR and thereby denotes the method of operation.

Reference: VOR/DME & VORTAC 1986

DOPPLER VOR.

General Note. A variety of terms refer to this system through variant forms. They are treated separately though integration is feasible. Selective notes added when needed.

DOPPLER VHF OMNI-DIRECTIONAL RANGE. Variant form of term.

Reference: Singapore

DOPPLER VOR. This form of VOR employs an antenna system based on the Doppler principle. It is employed when standard VOR has sitting problems.

Reference: Canada, Tugs AI 1991, VOR/DME & VORTAC 1986, ADS-Site 1969

DOPPLER VOR (DVOR). Variant form of term.

Reference: Field 1985

DVOR. Acronym for basic term: Doppler VOR.

References: Olsen AI 1990, Ben & Lux AIP

D-VOR. Toshiba offers hyphenated version of acronym.

Reference: Toshiba

b) Distance Measuring Equipment, DME

General Note. DME has acronym, non-acronym and combined forms to designate this Aid. There are fewer variant name forms than with VOR. But on the other hand there are more variations of DME. DME is the most common name though for this study a composite of Distance Measuring Equipment plus DME will be the basic name.

DISTANCE MEASURING EQUIPMENT (DME).

Reference: Kendal JN 1990, Kayton 1990, AIM 1991, AT 1996

DME. This is the most common name for this Aid. A word form, and word form with acronym are less employed. A variety of sources note that DME gives distance information. Cannes further notes that ground speed data is also given. The speed information is termed slant-range data since speed determined from aircraft to ground station at a slant.

References: Cannes 1992, CAA-FAP 1958, Toshiba

Classification #: 3521

Form of Device: Radio Aid to Navigation

Operation: Provides distance transmissions; ground speed data may be included.

Comments: See above.

A diversity of variant terms for DME is employed by some sources:

DISTANCE MEASURING DEVICES.

Reference: Singapore

DISTANCE-MEASURING EQUIPMENT (DME).

Reference: Wilson 1979

DME SYSTEM.

Reference: AT 1968, 1972

UHF DISTANCE MEASURING-EQUIPMENT (DME). The frequency is part of the name for some Aids including VOR. That is less often the case with DME though this ICAO term includes it.

Reference: AT 1949, 1985

There are a variety of specialized forms of DME:

DME/W. W denotes characteristics are wide spectrum. No longer installed.

Reference: ICAO AT 1968, 1985

DME/N. N=Narrow spectrum.

Reference: ICAO AT 1968, 1985

DME/P. P=Precise Distance Measurement. An acronym for word form.

Reference: ICAO AT 1985, Glines 1989

PRECISION DISTANCE MEASURING EQUIPMENT (P-DME)/MLS

PRECISION DISTANCE MEASUREMENT EQUIPMENT (DME/P).

References: Wilson 1979, MLS AI 1984, AIP 1999 (2nd)

c) TACAN/Tactical Air Navigation

General Note. TACAN is from military air navigation. The acronym is heavily employed. A second form is Tactical Air Navigation followed by the acronym. Acronym followed by word is less employed. Several other more obscure forms are also employed.

TACAN.

Classification #: 3523

Form of Device: Radio Aid to Navigation

Operation: A UHF Aid that has been the military equivalent of VOR/DME. It is the primary air navigation system for military services. It is often colocated with VOR thereby creating VORTAC. Tacan includes distance measuring function. It is several times more accurate than VOR in providing data.

References: DOT/DOD FRP 1996, Glob Pol AI 1991

TACTICAL AIR NAVIGATION (TACAN). Word form of title followed by acronym.

References: Kayton 1990, AIP 1991, AIM 1973, Flight 1971

TACTICAL AIR NAVIGATIONAL AID. This term appears to focus to some degree on the individual unit though the term is part of TACAN system.

Reference: NOTAMS 1987

TACTICAL AIR NAVIGATION SYSTEM. The term adds system to title and thereby more explicit in meaning.

Reference: Blake (Beck) 1971

TACAN, TACTICAL AIR NAVIGATION. Variant form in which acronym precedes word version.

Reference: ITT

TACAN SYSTEM. ITT offers this version of term. For ITT it included ground and shipboard "receiver-transmitter stations" and "airborne transmitter receivers".

Reference: ITT

d) Composite Terms

DVOR/DME. DVOR=Doppler VOR. This form employs the Doppler principle thereby reducing interference in the quality of signals. This term refers to a colocated installation.

References: Field 1985, Ben & Lux AIP

DVORTAC. Term refers to colocated unit of Tacan and Vor of the Doppler form.
Reference: Ben & Lux AIP

HVORTAC. Does “H” refer to class of Vortact and related Aids? “H” can refer to high altitude class of device. Information on meaning is limited.
Reference: AIM 1973, 2004

SVOR/DVOR. Canadian acronym for Standard VOR/Doppler Vor. Limited information only.
Reference: Transport Canada

TVOR. Acronym for Terminal VOR. Cross-reference with Terminal Aids.
References: AIM 2004, Electronic Nav aids 1976

VOR/DME//VOR-DME. A colocated system that forms an integrated Aid. Somewhat more sources employ VOR/DME form than VOR-DME. Most of the “slash” version is from government sources while most of the hyphenated forms are from book and journal references.
References: AIP 1999 (1st), Wilson 1979 (2nd)

DOPPLER VOR/DME. A system that conjoins Doppler from of VOR with DME.
References: Toshiba.

VOR/DME-BASED RNAV//VOR/DME RNAV. Term refers to a short range Aid. RNAV is a computer-based and airborne system that picks up signals from various sources and plots courses. This form engages VOR and DME systems.
Reference: Clausing 1987 (1st), HR 1984 (2nd), AIM 1991 (2nd)

VORTAC.
Classification #: 3522
Form of Device: Radio Aid to Navigation
Operation: colocated facility involving VOR (civilian) with TACAN (military).
Comments: System allows military aviation users to operated within civilian airspace. There are two sources for bearing information and one for distance data.
Acronym often employed instead of lengthy word form.

Reference: DOT/DOD FRP 1996, Taylor 1958

VHF OMNI-DIRECTIONAL RANGE/TACTICAL AIR NAVIGATION (VOR-TAC). Full form of the term though less employed than acronym of VORTAC.

Reference: AIM 1973

VHF OMNI-DIRECTIONAL RANGE/TACTICAL AIR NAVIGATION. Variant form with hyphen.

Reference: AIM 1991

ASSOCIATED VOR & TACAN (VORTAC). Variant form of term from Taiwan practice.

Reference: Taiwan.

VOR/DME (TACAN). An infrequently used term which seemingly refers to a TACAN as fulfilling functions normally handled by civil aviation. VOR/DME units. Source of term primarily concerned with civil aviation.

Reference: DOT & AID ... SE Asia 1971

BACKFIT VOR WITH TACAN RHO/THETA. Listed in FAP without explanation. VORTAC explained but not specific forms.

Reference: CAA-FAP 1958

3D3 Hyperbolic Aids

General Note I. These aids have been a vital element in navigation for more than sixty years in one form or other. Many forms are now obsolescent if not obsolete though they continue to find inclusion in recent and somewhat recent literature of the field. This coverage encompasses both recent and historic entries.

General Note II. Hyperbolic Aids have been vital to marine navigation as well. Part II of this Database included a variety of forms in current or past usage. There is no sharp dividing line between Aids for aero use and those for marine use. This coverage therefore overlaps with that of Part II.

a) Overarching Terms

HYPERBOLIC AIDS. These aids employ at least two transmitting stations. Transmissions from these station are compared and position of craft is thereby established. The lines of position (LOPS) take on the shape of a hyperbola hence their name. There is no single term employed for these Aids. Hyperbolic Aids was employed in Part Ii and a few references employ the term in this study. It seems a workable term for the subject. Classification employs Hyperbolic Systems rather than this term.

References: Grover 1957, Underdown 1993

HYPERBOLIC NAVIGATION SYSTEMS. This is a more explicit term for Aids employing hyperbolic approach to navigation. It is employed by few sources despite its overarching character. It is an alternate term in Part Ii.

References: Bauss 1963, McGraw-Hill 1992

HYPERBOLIC RADIO NAVAIDS. This term has a plausible nature as a general term though seemingly no other source employs it. Blanchard notes that Hyperbolic Radio Nav aids focus on area coverage rather than a single point approach.

Reference: Blanchard JN 1991

HYPERBOLIC AIRBORNE NAVIGATION AIDS. This term from Blanchard is part of a title of a series of essays. Possibly "airborne" denotes the aeronautical focus of his work.

Reference: Blanchard JN 1991

HYPERBOLIC RADIO NAVIGATION. Variant term that includes parts of several overarching terms.

Reference: H-W 2003

HYPERBOLIC SYSTEMS. A term favored by several references though it tends toward the vague.

References: Forssell 1991, Blanchard JN 1991

Classification #: 353

Form of Device: Radio Aid to Navigation

Operation: Diverse Aids employing hyperbolic processes.

Comments: Basic term in classification though database favors Hyperbolic Aids.

b) Loran

General Note. This term includes a variety of Aids. It can be used as a general term for all forms though but also apply to a specific form.

LORAN. This acronym is formed from the words LOnge RAnge Navigation. A chain consists of a master station and several slave stations. The master station transmits a signal which, when received at a slave station, causes first a delay at the slave station then a transmission from the slave station. Airborne equipment measures the difference in time from the signals. This creates a line of position; two LOPs determines plane's position. Two principal forms are Loran-A and Loran-C. ICAO Lexicon describes Loran as Long Range Air Navigation System which is a fuller name, explanation of the acronym.

References: Part II, Taneja 1987, Henney 1959 (Casabona), Kayton 1990

LORAN A/LORAN-A/LORAN-C. This is older than Loran-A and is obsolete. It transmitted on MF and for shorter distances than Loran-C.

References: Forssell 1991, Blanchard 1991

LORAN-C/LORAN A/LORAN-C SYSTEM. This refers to a form that is still operational though of declining significance. It is of LF nature and transmits over longer distances.

References: Forssell 1991, Blanchard 1991

LORAN-C.

Classification #: 3530

Form of Device: Radio Aid to Navigation

Operation: System employs LF transmissions allowing for longer distances.

Comments: A form that is still in operation though of declining significance.

Included in the classification.

Reference: Forssell 1991

STANDARD-LORAN/STANDARD LORAN/LORAN, STANDARD. These are older terms for Loran-A.

References: Bauss 1963, Powell 1971 (Beck)

H.F. LORAN. According to Williams this is a later name for Loran-A. Yet Loran A is MF.

Reference: Williams 1992

LOW-FREQUENCY LORAN/L.F. LORAN. This is a form of Standard or Loran A. It was LF rather than MF. It transmitted pulse rates different from Loran A and was less accurate.

References: Henney 1959 (Casabona), Hall 1957, Smith 1948

SS-LORAN (SYNCHRONIZED LORAN)/S.S. LORAN/SKYWAVE SYNCHRONIZED LORAN (SS LORAN). A World War II-era form that utilized the ionospheric reflections of the E-layer. It was accurate but the reflections were only in existence at night. It had military value but much less value for civil aviation.

References: Bauss 1963, Hall 1947, Blanchard 1991

LORAN-B/LORAN-D. There are forms of Loran that appear in the literature but have little bearing on air navigation. Loran-B was for marine use and did not achieve operational status. Loran-D was a tactical aid for military usage. It employed transmitters.

Reference: Blanchard 1991

DIFFERENTIAL LORAN. A form of Loran that provides corrections for transmitted signals thereby reducing errors, increasing accuracy.

Reference: Forssell 1991

DLORAN/DIFFERENTIAL LORAN-C. Basis of this system is identical to that of DGPS. Reference station provides corrected data. System that can be applied to harbors, airports.

Reference: H-W 2003

LORAN GNSS INTEROPERABILITY CHANNEL (LOGIC). A system that is similar to Eurofix. The system employs more than a single Loran-C station and produces data that is 99% accurate. Multi-station arrangements are known as RAAS (regional-area augmentation system (RAAS). RAAS may largely pertain to Eurofix.

Reference: H-W 2003

CHAIKA/CHAIKA (SEAGULL) SYSTEM/CHAYKA. The word is Russian for Seagull. It was developed by the former USSR. It was similar to Loran-C except for limited differences in the shape of pulses. Third term from H-W.

References: Kayton 1990, H-W 2003

CYCLAN. This is the original name for Loran.

Reference: Bauss 1963

CYTAC. A second older name for Loran.

Reference: Bauss 1963

GEE. A hyperbolic system usually referred to by GEE though alternate names are in use. It was a system developed in UK during World War II. It is similar to Loran (there was simultaneous development of the two systems), and equipment could be interchanged. Gee was short to medium range while Loran served longer ranges. Gee was of higher frequency transmission than Loran. Gee permitted two LOPs at a time while Loran transmitted one LOP at a time. However, Gee required many chains to cover a large area. Gee was complex in operation and labor-intensive. It is found more military than civil use.

Reference: Smith 1948, Grover 1957, Hall 1947, Williams 1992, Part E, 2nd ed.

GEE HYPERBOLIC SYSTEM/GEE SYSTEM. Alternate names for Gee that better explain the function than the core name.

Reference: Blanchard 1991

QH. An earlier name for GEE.

Reference: Blanchard 1991

c) Decca

General Note. Decca includes not only Decca but a variety of systems that are derivative of Decca. They are taken up in this segment.

DECCA.

General Note. Decca is a hyperbolic system that employs continuous wave transmissions and phase comparison measurement. Each unit has a master station and two to three slave stations. The stations broadcast continuous wave (cw) signals at different frequencies but which 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).

References: Casabona 1959, Kayton 1990, Part II 2nd ed

Classification #: 3532

Form of Device: Radio Aid to Navigation

Operation: System employs continuous wave transmissions and phase comparison measurements..

Comments: A system of declining usage.

DECCA NAVIGATOR/DECCA SYSTEM/DECCA NAVIGATION SYSTEM.

These terms are variant names that give a fuller idea of the nature of Decca.

References: Part II, Casabona 1959, Williams 1992, Grover 1957

QM. Official name for Decca in 1940s.

Reference: Blanchard JN 1991

DECCA HI-FIX. A marginal term that relates mostly to surveying. It appears in one surveyed source. Part II includes a Decca system known simply as Hi-Fix.

Reference: Part II, Bauss 1963

DELRAC. Acronym from DEcca/Long/R/Area/Covering. A phase comparison VLF system of considerable accuracy. Decca created Delrac in order to provide area coverage. VLF employed in order to create long distance coverage. It is

hyperbolic in nature.

References: Grover 1957, Williams 1992, Blanchard JN 1991, Bauss 1963

DECTRA. Acronym from DECca Tracking and Ranging. It is an older hyperbolic system listed in older ICAO titles. It achieved high accuracy and long range and provided directional coverage rather than area coverage. The system supplied coverage for trunk routes. Stations at ends of a route created a "track-guide system." Elements of Dectra were from Decca. The system, of US provenance, is apparently out of service.

References: Bauss 1963, Grover 1957

d) Consol

CONSOL.

General Note. This refers to a hyperbolic system employing short baselines. These lines are more in the form of straight lines or great circles than hyperbolae. Consol is known as a "collapsed" hyperbolic system as a result. Consol can be seen as both radial and hyperbolic; in effect, the hyperbolic dimension is not employed. Each unit has one transmitting station with three antennas. Bearings of a long distance character are provided. Consol is a derivative of Sonne. Sonne was Germany's long range Aid in World War II. ICAO included it under the UK designation of Consol. Differences between Sonne and Consul are small.

References: Part II, ICAO AT 1958, 1963, 5th Session IB 1954

Classification #: 3531

Form of Device: Radio Aid to Navigation

Operation: A hyperbolic system with short base lines.

Comments: A largely obsolete system that was included in the early version of the classification and has been retained.

CONSOL SYSTEM. Variant term for Consol that expresses its system character.

Reference: Casabona 1959, AT 1958, 1963, 1968, 1972, Fifth Session IB 1954

CONSOLAN. This refers to the US version which employed two antennas instead of the normal three. It was employed for a time in the San Francisco Bay and

Nantucket areas.

Reference: Bauss 1963

SONNE. A German Radio Aid that was later named Consol. An earlier version of Sonne was named Elektra.

References: Part II, Hall 1947

Some variant terms for Consol and/or Sonne include:

CONSOL (SONNE), Casabona 1959

SONNE/CONSOL, Blanchard 1991

SONNE (SUN), Blanchard 1991

SONNE (CONSOL), Blanchard 1991

MOND (MOON)/STERN (STAR). Versions of Sonne that employed alternative frequencies.

References: Blanchard 1991

e) Omega

OMEGA. A global hyperbolic system of somewhat recent vintage which was shut down in 1997 because of GPS. It operated in the VLF range and emitted CW signals. Eight stations, operating on time-share arrangement, provided worldwide coverage. Phase comparison of transmissions led to LOPs determinations. It was similar to Decca except that any two stations could be employed. Classified in marine classification but not in aero classification. It may have been more of a marine Aid.

References: AIP 1991, DOT/DOD FRP 1992, Part II, 2nd ed.

OMEGA/VLF//OMEGA/VLF NAVIGATION SYSTEM. A possibly confusing term. US Navy maintains a VLF band for communication. Some aircraft receivers could receive the Navy signals but not a separate Omega system signal. While the Navy system could be utilized for navigation it was not an official navigation system.

References: AIP 1991, Clausing 1987, AIM 1999

OMEGA/NCS SYSTEM. A naval communication system. It is a VLF system as is Omega. The combined system is not a Navaid but it can be combined into an integrated system.

Reference: Taneja 1987

OMEGA SYSTEM/OMEGA NAVIGATION SYSTEM. Variant terms that indicate more explicitly the purpose of Omega. Often times the core word of Omega was employed without amplifications.

Reference: Clausing 1987 (1st), Taneja 1987 (2nd)

DIFFERENTIAL-OMEGA. A special installation that corrected regular signals and thereby improved their accuracy.

Reference: Kayton 1990, Forssell 1991

OMEGA/LORAN-C. Term included in a chart of current systems. Both Aids are placed together possibly because of long-distance nature.

Reference: Ostiguy IJ 1991

f) Miscellaneous Hyperbolic Aid Forms

EUREKA/REBECCA-EUREKA/REBECCA/EUREKA/REBECCA-EUREKA DISTANCE MEASURING SYSTEM. A system developed in World War II and included briefly in a few sources. Eureka was a Radar Responder Beacon. Rebecca was an airborne unit that interrogated (activated) Eureka for navigational data. This it is not a Hyperbolic system though it is an En-Route Aid.

References: Smith 1948 (1st), Bauss 1963 (2nd), Grover 1957, Smith 1948 (3rd), Blake 1971 (4th)

LORAC. Lorac (LOnge/Range/ACcuracy) is a system that employs phase comparison methods to create hyperbolic LOPs. A Lorac chain has a main station and two side stations. It is seemingly employed for survey work. It is similar to Raydist which is discussed in Part II.

Reference: Blanchard 1991, Part II, 2nd ed.

NAVAGLOBE-NAVARHO. These are terms of confusion. For Bauss a system

known as Facon provided distance measuring. Navaglobe provided bearing information only. When combined they became Navarho. For Casabona it is Navaglobe when bearing only but adding additional airborne equipment allows ground equipment to add distance data and the system thereby becomes Navarho. Grover sees Navarho as a bearing/distance system; Navaglobe was "passed over in favor of Navarho." ICAO employs both names together. The Navaglobe phase is long range and is an area coverage aid.

References: Bauss 1963, Casabona 1959, Grover 1957

NAVAGLOBE/NAVAGLOBE SYSTEM. See Navaglobe-Navarho.

References: Bauss 1963, Casabona 1959 (1st), Casabona 1959 (2nd)

NAVARHO SYSTEM. See Navaglobe-Navarho.

Reference: Casabona 1959

NAVARHO-H, -HH, -RHO. Single H is a position aid determined by one radial and one hyperbolic lines intersecting. HH consists of two hyperbolic lines intersecting. The rho form consists of two radial lines intersecting.

References: Bauss 1963

POST OFFICE POSITION INDICATOR (POPI)/POPI (POST OFFICE POSITION INDICATOR)/P.O.P.I. 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.

References: Casabona 1959 (1st), Blanchard 1991 (2nd), Smith 1948 (3rd, 4th)

RAYDIST. A navigation system employed largely for hydrographic, geophysical survey and ship trials work. It employs phase comparison methods that use two physically separate cw signals. There are several versions.

References: Bause 1963, Special Issue-IEEE 1993, Part II, 2nd ed.

RADIO-MAILLES SYSTEM. A Hyperbolic system under development in early 1960s. It is of French provenance; its fate is not known. It was employed for navigation and position determination. It was also employed for traffic control

and collision avoidance.

Reference: Bauss 1963

RADIO-WEB/RADIO-MESH. Alternate names for Radio-Mailles.

Reference: Bauss 1963

RADIO MESH SYSTEM (RADIO-MAILLES). English-language term for Radio-Mailles System.

Reference: Bauss 1963

RADUX. This is a LF hyperbolic system with long-base lines for long-distance navigation. It transmitted from at least three stations. There are references to Radux in the 1940s-1960s but seemingly not beyond that time period.

References: Casabona 1959, Blanchard JN 1991, Part II

RADUX-OMEGA. A form of Radux (LF) with an added component at VLF resulted in this Aid. Eventually a VLF version was developed and Radux dropped out.

References: Sakran IEEE 1998, Blanchard JN 1991

RANA. A system included by Blanchard but seemingly of limited aero usage. It is a hyperbolic system that is cw in nature and uses phase comparison methods. A chain has three stations with two sets of transmitters per station. The slave unit synchronizes emissions thereby creating a hyperbolic pattern. Bauss claims Rana is the French name for Lorac but IALA considers them separately.

References: Blanchard JN 1991, Part II 2nd ed

TORAN. A hyperbolic system of considerable precision. Shipboard receivers determine phase differences from three transmitters. Toran is HF though the confocal transmitters produce a LF beat indication.

References: Blanchard JN 1991, Part II, 2nd ed

3D4 Satellite Nav aids

a) GPS

1) Main Terms

GPS, GLOBAL POSITIONING SYSTEMS.

General Note I. GPS, a relatively new aid, has blossomed into many forms with many users. The literature in book and journal forms is extensive. The core idea and explanations have simplicity and coherence. Yet the primary term has many nuanced forms. The primary coverage in this segment is under the heading of the acronym, GPS, the most common title for the Aid. The coverage also includes briefer coverage of various combinations of letters and word titles. Specialized and composite terms are also included.

General Note II. A form of GPS includes: word form; word form followed by acronym; acronym followed by word form; forms centering on Navstar-GPS in several permutations.

GPS. This three-letter acronym is the most common designation. GPS is sometimes referred to as space-based while in other instances it is termed satellite-based. While it is situated in space it is based in a series of satellites. It is described as both a navigation and a positioning system. It is operated by DOD but has widespread civil use. It is global in character. GPS has been fully operational since 1995 though it dates back to the late 1970s. It provides position, velocity and time data. It is increasingly employed by all forms of transportation. While there are numerous satellites in the system only a small number are required for accurate position determination. Two forms of data are given: one phase gives satellite position in a context of time while the second 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.

References: French 1996, AIM 1999, Part II, 2nd ed., DOT/DOD FRP 1999

Classification #: 354

Form of Device: Radio Aid to Navigation

Operation: Satellite-based transmissions to receivers

Comments: See above. Note: Class has acronym as well.

GPS SYSTEM. System appears twice in the title: in the acronym and in word form. This may suggest that an acronym can take on a life of its own and words represented by letters effectively drop out or become hidden. A relatively limited number of references include the term.

References: Burgess IEEE 1988, T & C 1991, Loh CGSW 1995

Other forms of GPS and variations include:

GLOBAL POSITIONING SYSTEM (GPS). Basic term followed by acronym. Some sources omit GPS.

References: AIM 1991, Clausing 1987, Olsen AI 7-91, French 1996, Gupta 1996, Dodington EC 1984, Lazzaroni EC 1984

GPS, GLOBAL POSITION SYSTEM. Acronym followed by word form.

References: Europe IJ 1997

2) Specialized and Composite Terms

CAT II/III GPS. GPS applied to navigation on Cat 2, Cat 3 levels.

Reference: Daly 1994

GLOBAL POSITIONING SATELLITES. Kayton refers to satellites that are part of GPS. This represents the physical infrastructures of GPS.

Reference: Kayton 1990

GPS/GLONASS/GPS-GLONASS. Two sources that include these terms are referring to receivers in aircraft capable of receiving signals from either GPS or GLONASS. They are not Nav aids in themselves despite appearances.

References: Kayton 1990 (2nd), DOT/DOD FRP 1999 (1st)

GPS (GLOBAL POSITIONING SYSTEM) SATELLITE-BASED NAVIGATION SYSTEM. This may be more descriptive than a formal name.

Reference: Bethmann 1984 EC

GLOBAL POSITIONING SYSTEM, GPS
STANDARD POSITIONING SERVICE (SPS).
PRECISE POSITIONING SERVICE (PPS).

GPS has two forms. A more precise and accurate form for military and a standard version which is less accurate. President Clinton dissolved the distinction. References: DOT/DOD FRP 1999, H-W 2003

RAIM. RAIM=Receiver Autonomous Integrity Monitoring. This refers to a dimension of aircraft-based equipment that determines if a satellite is emitting information that is corrupted and thereby not accurate. This is not a Navaid though closely related to Nav aids and on occasion closely related to GPS. Reference: AIM 1999

GPS/RAIM. Seemingly at least one source sees RAIM as a component that augments accuracy of GPS and thereby an element of the GPS process. Reference: Loh 1995 GPSW

3) Navstar GPS

General Note. This coverage consists of primary entry followed by various alternate titles and several specialized terms.

NAVSTAR (NAVIGATION SYSTEM WITH TIMING & RANGING). Navstar is an acronym from the words Navigation System with Timing and Ranging. French possibly employs the extended phrases since he separates Navstar GPS from the extended term. References: Forssell 1991, French 1996

NAVSTAR. Wright employs Navstar as the complete name. However, that practice occurred in the early 1970s when Satnav was in an early stage. Reference: Wright 1971 (Beck)

NAVSTAR SYSTEM. An alternate name for GPS. Reference: T & C 1991

NAVSTAR GLOBAL POSITIONING SYSTEM/NAVSTAR GLOBAL POSITIONING SYSTEM (GPS). This represents the full and official name of what is often termed GPS. The second form is from Rankle (Navstar GPS project manager). He normally uses GPS after beginning with full name.
References: Williams 1992, Runkle 1988 IEEE

NAVSTAR GPS. A slightly shorter version combining Navstar with acronym GPS.
References: Runkle 1988 IEEE, Burgess IEEE 1988

NAVSTAR-GPS. This hyphenated version may not be different in meaning from other versions of the basic term. Kayton's use of the term is unclear. Bethmann's use of the term is seemingly a synonym for other versions of the basic term.
References: Kayton 1990, Bethmann 1984 EC

NAVSTAR/GPS. Clausing employs this version consistently. He wrote before the system was fully operational. Clausing's usage may suggest two terms or systems that are brought together as a combined or single system. Forssell begins with Navstart then moves to GPS without explanation.
References: Forssell 1991, Clausing 1987

NAVSTAR SATELLITES. Term refers to satellites in themselves. A reference to Navstar alone also appears to indicate satellites rather than entire system.
Reference: GPS The One... AI 1991

GLOBAL POSITIONING SYSTEM (NAVSTAR). Navstar seemingly serves as an alternate name for GPS.
Reference: T & C 1991

4) GLONASS

GLONASS/GLONASS (GLOBAL NAVIGATION SATELLITE SYSTEM). Soviet satellite navigation system similar to GPS. Glonass is an apparent acronym for Global Navigational Satellite System. It is an element of ICAO's planned

GNSS operation.

References: Lechner 1994 (GPSW, Sutton IA 1993, Olsen AI 11-93, DOT/DOD FRP 1999 (1st), Forssell 1991 (2nd)

GLONASS, GLOBAL ORBITING NAVIGATION SATELLITE SYSTEM. This version adds the word Orbiting to the basic term. H-W employs same version with acronym after the full version. A Russian system for navigation and guidance. Employed specifically in international service as "position-fixing" function. Reference: IJ Europe Tripartite ... 1997, H-W 2003

b) Augmentation Terms

1) DGPS

DIFFERENTIAL GPS. Term refers to system of ground stations that provide information corrections of satellite-based GPS. Various conditions affect GPS transmission including atmospheric factors can induce GPS signals. Maritime DGPS consists of stations under that name which provides corrections to users. Users then correct GPS signals. For aero use DGPS is utilized through WAAS and LAAS which see.

Classification #: 3541

Form of Device: Radio Aid to Navigation

Operation: Augmentation system for GPS

Comments: See above

DGPS terminology appears in a variety of guises. However, the concept and Aids are closely united. Variant forms of terms included:

DIFFERENTIAL GPS (DGPS).

References: Daly FI 1994, Fitzsimmons AF 1995, L & W GPSW 1995

DGPS.

References: Daly FI 1994, Sutton IA 1993, L & W GPSW 1995, Pace 1995

DGPS SYSTEM.

Reference: Fitzsimmons AF 1995

DIFFERENTIAL GLOBAL POSITIONING SYSTEM/DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS)

Reference: Gupta 1966 IEEE

DGPS LANDING SYSTEM/SPECIAL CATEGORY I DGPS LANDING SYSTEM/DGPS SPECIAL CATEGORY LANDING SYSTEM. Hundley and Rowson described testing and development of Wilcox DGPS systems. These various terms and systems appear to be a form of LAAS which see. They are intended to provide precision assistance for approach and landing operations in lieu of ILS and MLS.

Reference: Hundley and Rowson (H & R) GPSW 1993

DGPS GROUND REFERENCE SYSTEM. Term refers to physical apparatus on the ground; other equipment is airborne.

Reference: H & R GPSW 1993

DGPS GROUND STATION. This refers to ground aspect of DGPS system. It refers to makers of equipment.

Reference: Fitzsimmons AF 1995, H & R 1993

AERONAUTICAL-DGPS. FRP includes various forms of GPS and the addition of Aeronautical is probably done to distinguish between Marine and Aero forms.

Reference: DOT/DOD FRP 1992

GPS DIFFERENTIAL CORRECTION (dGPS). Seemingly the equivalent of DGPS unless it describes the process of corrections.

Reference: Underdown 1993

DGPS/INS. This term is doubtful. It seems to indicate a phase of APALS (Autonomous Precision Approach Landing System, a new experimental system).

Reference: Daly 1994

HELICOPTER-BORNE DGPS SYSTEM. A system in UK for Lighthouse authorities engaged in helicopter operations. Marine Radiobeacons supply differential corrections.

Reference: Last and Ward GPSW 1995

INTELLIGENT SMALL AREA DGPS. Term refers to use of artificial neural network (ANN) technology for small area DGPS. Designed especially for Singapore. Presumably SADGPS need not have the intelligent dimension.

Reference: Gupta 1996 IEEE

NATIONAL DGPS (NGPS). Specific reference is to Maritime Radiobeacons that have been altered for differential service. They constitute a national operation.

Reference: H-W 2003

NATIONWIDE DGPS (NDGPS). Term refers to Marine Radio Beacons that have been altered to serve differential GPS function and are now extended to a national setup.

Reference: H-W 2003

2) WAAS & LAAS Augmentation Terms

GPS/LAAS//GPS/WAAS. Terms for LAAS and WAAS employing augmentation processes from GPS.

Reference: H-W 2003

LAAS. Acronym for Local Area Augmentation System.

Reference: DOT/DOD FRP 1996

LAAS Cat I. Augmentation for Cat I landings. See also LAAS.

Reference: H-W 2003

LOCAL-AREA AUGMENTATION SYSTEM (LAAS). Augmentation system that is ground based. It focusses on local conditions and is employed for Cat II and III precision approaches. In some circumstances it is applied to Cat I as well.

References: Fitzsimmons AF 1995, DOT/DOD FRP 1999

LADGPS. French employs this acronym and written form of Local Area DGPS. Though LAAS is a more common term.

Reference: French 1996

RAAS. Acronym for Regional Area Augmentation System. Eurofix is one operational example.

Reference: H-W 2003

SADGPS.=Small Area DGPS. This form employs artificial neural network for increasing accuracy in a small area such as Singapore. It does not employ DGPS.

Reference: Gupta IEEE 1996

WIDE AREA AUGMENTATION SYSTEM (WAAS). This refers to a satellite-based augmentation system. It provides data for a variety of aviation approaches and provides differential corrections for GPS transmissions.

References: DOT/DOD FRP 1999, Fitzsimmons AF 1995, Johns IJ 1997

FAA FTP presents a more complete view of WAAS and its components:

WIDE-AREA REFERENCE STATIONS (WRS) which are physically (geographically) separate units.

WIDE-AREA MASTER SYSTEMS (WMS)

SATELLITE BROADCAST SYSTEMS

Data received and worked on at WRS. WMS processes the data in order to make corrections and improve quality of data. The finished product goes to:

GEOSTATIONARY COMMUNICATION SEGMENT (GCS) and then delivered by uplink to

GEO SATELLITES.

Reference: FAA FTP 2000

WAD GNSS. Wide-Area Differential GNSS. Augmentation for systems that fit under heading of GNSS

Reference: H-W 2003

WADGPS. WADGPS=Wide Area DGPS. There are two forms: WAAS: Wide

Area Augmentation System in US. And FANS: Future Aids to Navigation System in remainder of the world.

Reference: Gupta IEEE 1996

WAAS. Acronym for Wide Area Augmentation System. It is often employed as a stand-alone term.

Reference: DOT/DOD FRP 1996

W.A.A.S. French provides a variant form of the basic acronym. French also employs WAAS as well as a spelled-out version.

Reference: French 1961

WAS. Acronym for Wide Area System. WAS includes Wide Area System and LAPGPS, Local Area DGPS.

Reference: French 1996

3) Other Augmentation Terms

AREA-BASED SYSTEMS. Multiple transponders provided information for a given area. Contrast to Point-to-Point Systems.

Reference: H-W 2003

CATEGORY I GROUND BASED AUGMENTATION SYSTEM (GBAS). Replaces Special Category I Differential GPS (SCAT-I DGPS).

Reference: H-W 2003

DIGITAL TV NETWORK. System may be used for position information. Not operational so far.

Reference: H-W 2003

EGNOS, European Geostationary Navigation Overlay Service. A regional satellite-based augmentation system. See also Artemis.

Reference: H-W 2003

EUROFIX. Regional GNSS augmentation system. It is built on Loran-C

infrastructure. At present it works with GPS only.

Reference: H-W 2003

GBAS. Acronym for Ground-Based Augmentation. It refers to GNSS augmentation at airports. LAAS is a similar term in US.

Reference: H-W 2003

OMNISTAR. Commercial DGPS service spanning most of the globe. It supplies "code pseudorange corrections."

Reference: H-W 2003

SATELLITE-BASED AUGMENTATION SYSTEM (SBAS). Term for several regional augmentation systems. Three most significant systems are WAAS (US), European Geostationary Navigation Overlay System (EGNOS) and Multi-functional Transport Satellite Augmentation System (MSAS) in Japan.

Reference: H-W 2003

c) GNSS

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). This term has three possible meanings. It can refer to any system that provides navigation aid data by satellite (Underdown for example). It can refer to existing systems such as GPS and GLONASS (Olsen AI 3-90). Or it can refer to a system in development by ICAO that goes beyond existing satellite nav aids. GPS is perceived as not fully supplying the level and breadth of navigation needs and is less than adequate in some other respects. GNSS is to be a civil system that meets the needs of all users. Such a system supplies information for position, velocity, time.

Reference: Fitzsimmons 1995, Loh 1995, IJ Europe Tripartite ... 1997

GNSS. Acronym for Global Navigation Satellite Systems which is often employed as a stand-alone term.

Reference: Crow 2000

GNSS, GLOBAL NAVIGATION SATELLITE SYSTEM. Acronym accompanied by word for employed by some sources. A slightly variant form.

Reference: D. Olsen AI 3-93

GNSS (GLOBAL NAVIGATION SATELLITE SYSTEM). Yet another slight variant of basic title.

Reference: D. Olsen AI 2-93

GNSS-1. In Europe GPS and GLONASS are sometimes termed GNSS-1 to differentiate from more advanced forms under development. GNSS-1 also includes the various kinds of augmentation forms of GPS and GLONASS.
Reference: Europe Tripartite IJ 1997

GNSS-2. Future system for satellite systems. GNSS-2 sometimes known simply as GNSS. See also GNSS-1.
Reference: Europe Tripartite IJ 1997

GNSS LANDING SYSTEM (GLS). System supplies precise guidance for landing approaches through differential augmentation.
Reference: AIM 2004

DIFFERENTIAL GNSS SYSTEM. Augmentation system for navigation satellite groups that are part of GNSS.
Reference: Fitzsimmons 1995, H-W 2003

CAT II/III GNSS APPROACHES. A system or sub-system for precision approaches.
Reference: Sutton 1993

GNSS-BASED OPERATING SYSTEM.. This is not an official term. Rather, it is more of a descriptive phrase for navigation operations using GNSS (which is not yet in operation).
Reference: Loh 1995

d) Other Satellite Navigation Terms

1) Satellite Navigation Terms

GALILEO SYSTEM. An independent system for navigation controlled by European interests and global in scope. It is a GNSS service. Various terms and services associated with Galileo:

Open Service. Can be employed with fees. It offers position and timing service.

Search and Rescue.

European aspect of COSPAS-SARSAT service which is involved in search and rescue efforts.

SAR is involved with MEDIUM EARTH ORBIT SEARCH AND RESCUE SYSTEM (MEOSAR).

H-W includes Galileo with variant terms:

GALILEO SAR SYSTEM

SAR BEACON

SAR SYSTEM

References: European Space Agency 2009, H-W 2004

GLOBAL SATELLITE SYSTEM FOR NAVIGATION. General term for proposed navigation system.

Reference: Europe ICAO Journal, 11-1997

NAVIGATION SATELLITE SYSTEM. Overarching term for satellite navigation system.

Reference: Canada 1993

NAVSAT. This is a specific term more than an overarching term for satellites. It was a specific system of European Space Agency in mid-1980s. It was intended to monitor GPS and GLONASS.

Reference: Taneja 1987

SATCOM//SATCOM/SATNAV. These are seemingly specific terms and meanings but reference provide few details.

References: Olsen (several references)

SATELLITE-ASSISTED NAVIGATION (GNSS/GPS). This can be viewed as a general term since it includes two major forms; one developed, one in the process of development.

Reference: Underdown 1993

SATELLITE-BASED NAVIGATION SYSTEM. Overarching terms for all systems pertaining to navigation. 2nd term somewhat vague unless within navigation context.

SATELLITE LANDING SYSTEM. One maker of DGPS System hardware employs this name which may suggest an overarching or sub-overarching term. See also: DGPS Ground Station.

Reference: Fitzsimmons 1997

SATELLITE NAVIGATION. A general term that can refer to Satellite Navigation Systems.

References: Clausing 1987, Olsen AI 1991, 1993, Reynish ATW 1999

SATELLITE NAVIGATION AIDS.

Classification #: 354

Form of Device: Radio Aid to Navigation

Operation: Satellite-based transmissions to on-board receivers.

Comments: Term does not appear in Database other than Part H, Classification.

Reference: Part H

SATELLITE NAVIGATION SYSTEM. A generic, overarching term.

References: Blake, Bethmann, T & C 1991

SATELLITE POSITIONING SYSTEM. Term with Transit listed as one such system.

Reference: Cleasby IJ 1999

SATELLITE SYSTEM. A very general term though reference is to specific terms.

Reference: McDonald in Beck 1971

SPACED-BASED NAVIGATION & POSITION SYSTEM. This reference is to GPS and is not an overarching term though it could so employed.

Reference: French 1996

2) Transit & US Navy System

General Note. There are a welter of terms and sub-terms for what is often known as Transit. Despite the variety of terms it focusses on a single aid. It is necessary to include and separate many of these essentially similar (in meaning) terms.

US NAVY NAVIGATION SATELLITE SYSTEMS. This is possibly the official designation. Often US is deleted. Transit (from the satellite hardware) is a common name. The system is a positioning system based on satellites. The system was largely intended for ships. Initially it was intended for submarines then surface ships. It employed polar orbits and was of a Doppler form. Its use ended in 1996.

Reference: DOT/DOD FRP 1992, Blake in Beck 1971

US NAVY SYSTEM. A somewhat shorthand form of the full name. Presumably the reader or user knows it refers to navigation satellites.

Reference: McDonald in Beck 1971

NNSS (NAVY NAVIGATION SATELLITE SYSTEM)/NAVY NAVIGATION SATELLITE SYSTEM (NNSS). Frequently one of these terms (acronym alone, or followed by full name, or preceded by full name) were employed.

References: DOT/DOD FRP 1992, Forssell 1991

TRANSIT. A term of some confusion. It is frequently a common name for US Navy Navigation Satellite System. In some cases it is an alternate for NNSS while in other cases NNSS is an alternate. For at least one source it is the former name for the Navaid. Possibly the satellites known as Transit contributed the name.

Reference: Blake in Beck, Williams 1992, Kayton 1990, Cleasby 1999

TRANSIT SYSTEM. Some sources add System to Transit thereby increasing the clarity of the core term.

References: Blair 1984, EC, Forssell 1991

US TRANSIT/US TRANSIT SYSTEM. One source adds US to the core word. It is possibly a identification aid to Transit rather than part of the actual term. A second source adds System. This may further identity the Aid and possibly differentiate it more adequately from other systems.

Reference: Wright in Beck 1971(1st term), French 1996 (2nd term)

3) Miscellaneous Terms

AREA-BASED SYSTEMS. Multiple transponders provided information for a given area. Contrast to Point-to-Point Systems.

Refernce: H-W 2003

ARGOS SYSTEMS (Advance Research & Global Observation Satellite). System involves "positioning, data, and data transfers" involves environmental research.

Reference: H-W 2003

CELLULAR COMMUNICATION NETWORK. An area-based system. It presents position of cell phone user. A kind of position and fixing system.

Reference: H-W 2003

CICADA. Alternate spelling for Tsikada which see.

Reference: H-W 2003

DATATRACK. Local Navigation system. It included navigation and communication phases.

Reference: H-W 2003

DEFENSE NAVIGATION SATELLITE SYSTEM (DNSS). A merger of System 621 B and Timation; Navstar-GPS emerged from this system.

Reference: French 1996

EUTELTRACS, European Telecommunication & Tracking System. Fleet management and security enlargement (vehicles, cargoes, people).

Reference: H-W 2003

GEOSTAR/LOCSTAR. A system similar to Starfix though of a different frequency. It had the character of a “two-way ranging system.”

Reference: Forssell 1991

GRANAS. A proposed system for SEL. The system was similar to Navsat (from European Space Agency).

Reference: Blair 1984 EC

INTEGRATED GLOBAL SURVEILLANCE & GUIDANCE SYSTEM (IGSAGS). A possible replacement for GPS. It is a complete CNS/ATM system that is more economical and secure system. In development.

Reference: Crow 2000

STARFIX/STARFIX POSITIONING SYSTEM. A private system that primarily operated in the Gulf of Mexico for the petroleum industry. It provided “pseudo range data.”

Reference: Forssell 1991, Williams 1992, Ott IEEE 1988 (2nd term)

TIMATION. A prototype Position and Navigation system that was never operational. It preceded GPS.

Reference: French 1996

TSIKADA. A Soviet system similar to Transit. It ended when Glonass began.

Reference: Forssell 1991

TSPI SYSTEM. TSPI=Time Space Position Information. It is referred to as a “truth system” and its function was to measure the accuracy of LAAS developmental prototype.

Reference: S & K 1999

There are a number of terms that refers to satellites. While they may not be Nav aids in themselves they constitute the physical structure of Nav aids.

ARTEMIS SATELLITES/IOR SATELLITES/IOR INMARSAT III
SATELLITES. Satellites employed in European EGNOS program.
Reference: European Tripartite Group IJ 11-1997

INMARSAT SATELLITES/INMARSAT-A SYSTEM/INMARSAT -1, -2, -3, -4
SATELLITES. Inmarsat, International Maritime Satellite Organization, employs a wide array of satellites and systems. Uses include distress and safety functions. GPS services is a major role.
References: [http: www.alphatelecom.ru/inmarsat/engindex.htm](http://www.alphatelecom.ru/inmarsat/engindex.htm), Olsen AI J/A 1991, Olsen AI 11-93,

MSAS, Japan Multifunctioning Transportation Satellite (MTSAT) Satellite-Based Augmentation System. Acronym for Multifunctioning Satellite Augumentation System. Some sources employ MTSAT which is a acronym for physical satellite system which see.
References: H-W 2003, AIM 2004
Reference: F & A 1997

MTSAT, MTSAT -1, 2, MTSAT SATELLITES, MTSAT SYSTEM. MTSAT (=Multi-faceted Transport Satellite). A system of satellites in Japan that serves as the basis for a CNS/ATM operation. Physical foundation for MSAS.
Reference: F & A 1997

3E Intercategory Group: Beacons

General Note I. Intercategory refers to terms that span en route and terminal categories. Terms can be in one or both categories. In some instances seemingly related terms can be split between categories. Cross-references are required within respective categories.

General Note II. Many terms are included in Beacons, Marks, and Markers. The coverage is divided between Beacons, and Marks and Markers because of the intertwining of terms.

General Note III. Direction Finding may be largely en route though some terminal terms may be present.

3E1 Nondirectional Beacons (NDB)

NDB NAVIGATION. This is simply navigation that employs NDBs. It is the oldest extant electronic navigation form. The transmitter apparatus bears resemblance to AM radio transmitter. Airborne equipment consists of receiver, indicator, circuits that translate signals to bearing data. US enroute navigation, now rare save for Alaska, is also employed in some parts of the world. It is employed as a Terminal Aid for numerous small airports.

Reference: Clausing 1987

NON-DIRECTIONAL BEACON.

Classification #: 3524

Form of Device: Radio Aid to Navigation

Operation: L/MF transmitter broadcasting bearing information.

Comments: There are four types: Compass Locator, Approach facility, Enroute Beacon, high-power beacon at coastal sites (which presumably refers to a Radio Beacon). Some sources may give a single use for the NDB.

Reference: Clausing 1987

NON-DIRECTIONAL BEACON (NDB). One source refers to this permutation

as an “ILS-associated” type. A second source refers to both enroute and terminal forms.

References: Maint of ILS 1986 (1st), Olsen (AI) 1992 (2nd)

NDB GROUND-BASED SYSTEM. This term refers to physical apparatus: radiator and transmitter/monitor.

Reference: Maint of ILS 1986

NONDIRECTIONAL RADIO BEACON. This version adds the word radio. The specific source places it in a context of Terminal Aids (the focus of the publication). FAA-approved forms are termed COMLOS; non-FAA version may be a homing beacon.

Reference: ADS-Site 1973

NON-DIRECTIONAL RADIO BEACON. While Nondirectional Beacon is the basic form of this Aid a variety of sources hyphenate the term and add radio. Messages are in Morse code in a continuous three letter format. Canada includes four forms under this heading: air routes, airways w/o VOR, approach aid for non-precision situations, compass locators.

References: AIP 1973, 1991, Glob Pol AI 1991, Canada

NDB. An acronym frequently employed in lieu of Nondirectional Beacon.

Acronym probably used more often.

References: DOT/DOD FRP 1990, 1999

NDB (LF/MF NON-DIRECTIONAL RADIO BEACON). This version includes frequency and radio.

References: AT 1952, 1958

NDB, NON-DIRECTIONAL RADIO BEACON. A slight variation in the basic term. The source did not provide details of contents of term.

Reference: 2nd Air Nav IB 12-65

NDB, (NON-DIRECTIONAL BEACON). Table of contents listing. It refers to Non-Directional Radio Beacon.

Reference: AIM 1973

NDB, NON-DIRECTIONAL BEACON. A slight variant form of the basic term. This version refers to a long-distance Aid.

Reference: 5th Session IB 5-64

NONDIRECTIONAL BEACON (NDB). Variant form with full name followed by acronym.

Reference: DOT/DOD FRP 1996

NON-DIRECTIONAL RADIO BEACON (NDB). This variant form from AIM includes four classes arranged by sending distance of transmissions: Compass Locator, 15 miles; class MH, 25, class H, 50 miles; class HH, 75 miles.

Reference: AIM 1973

L-F MARKERS. This refers to NDB. Employed primarily with airborne ADF (Automatic Direction Finders). There are three types: H, HH, MH. See also Non-directional Radio Beacon.

Reference: Casabona 1959

LOW-FREQUENCY NONDIRECTIONAL BEACON. This version comes from IFH. It can include navigation fixes or homing functions. Four forms of homing function. Higher powered form for over-water routes, lower power type, and compass locator (divided into Outer Locator or LOM or Middle Locator or LMM).

Reference: IFH 1971

LOW FREQUENCY NON-DIRECTIONAL BEACON. AIP includes this term in its table of contents but the entry omits Low Frequency and notes it can be either LF or MF.

Reference: AIP 1191

LOW - & MEDIUM-FREQUENCY NONDIRECTIONAL RADIO BEACON. Term adds radio to basic term. RTCA in Poritsky notes the term is a general heading for a class of Radio Aids to Navigation. Its major use involves "mobile

directional finders” and provides bearing data. Poritsky also notes that NDB= Marine Radio Beacon. They were begun by Bureau of Lighthouses in 1921. In 1934 airborne direction finder was developed which was designed for picking up NDB signals.

Reference: Poritsky 1959

LF/MF NDB (NON-DIRECTIONAL RADIO BEACON). Under the classes of Radionavigation Aids (ICAO) there is a segment of Radio Beacons which includes Marker Beacon and this Aid.

Reference: AT 1952, 1958

LF/MF NDB. One ICAO title refers only to Locator (Not Compass Locator).

Reference: AT 1963

L/MF NON-DIRECTIONAL RADIO BEACON. Alternate name for Non-Directional Radio Beacon.

Reference: CAA-FAP 1958

COMPASS LOCATOR. This is a NDB operating with ILS Markers. Principal entry in Terminal Aids.

References: AIM 1973, NOTAMS 1993

HOMER. Seemingly a colloquial term though in an official source. It refers to low and medium frequency NDB termed Non-Directional Radio Beacons.

Reference: CAA FAP 1958

LOW & MEDIUM FREQUENCY NON-DIRECTIONAL RADIO BEACON (L/MF). The information provided gives direction information (azimuth) from ground signals. Location can be determined by using data from two such Beacons. Beacon in ILS provides information for determining localizer course; it can also act as distance marker for runway end.

Reference: CAA FAP 1958

AERONAUTICAL NONDIRECTIONAL BEACON/AERONAUTICAL NON-DIRECTIONAL BEACON. FRP adds Aeronautical to basic term. Probably

because publication includes both marine and aero forms (OA term): Aeronautical and Maritime Radiobeacons). FRP sees the NDB as a transition Aid between en route and precision terminal approach facilities. It also serves as a non-precision approach Aid. This is in contrast to viewing NDB as both en route and terminal Aid.

References: DOT/DOD FRP 1992, 1999 (1st form), DOT/DOD FRP 1990 (2nd form)

AERONAUTICAL NONDIRECTIONAL BEACON (NON-ILS). This refers to a NDB in Terminal Navaid service. Aeronautical probably added because publication also includes marine forms.

References: DOT/DOD FRP 1996

AERONAUTICAL RADIOBEACONS. An alternative term that refers to NDB.

Reference: DOT/DOD FRP 1996

ILS NONDIRECTIONAL BEACON (NDB)/ILS-ASSOCIATED NONDIRECTIONAL BEACON. These terms do not mention COMLO (Compass Locator) but instead notes that NDB may be collocated with Outer Marker (LOM: Locator Outer Marker) and sometimes Middle Marker (LMM: Locator Middle Marker).

Reference: Maint of ILS1986

3E2 Marks, Markers, Beacons

General Note I. This category contains a variety of Markers Beacons and also a limited number of Marks and Markers. They may be employed for a variety of functions. Specifically, ILS and MLS forms are to be found in those categories.

General Note II. Classifications are incomplete for a variety of terms in this segment. En-Route VHF Marker Beacon is in the classification along with related and component Aids. The Classification needs to include Radio Beacons and possibly Rotating Beacons. Some Markers are within En-Route VHF Marker Beacon but perhaps not all forms. Marks are listed in the heading but no forms actually included. Variant Classification may be an appropriate place for some of

the terms.

BEACON. Beacon for Kendal is a short form for various aids including the Wireless Lighthouse (Radio Beacon).

References: Kendal 1990, St John Sprigg 1934, Solberg IB 1953

BEACONS FOR NAVIGATION. An apparent OA term yet it seemingly is a short form of Beacon Transmitters for Fixed Course & for Long-Range Navigation which see.

Reference: Keen 1938

BEACON STATION. Term refers to Radio Range Beacon and Radio Marker Beacon.

Reference: Komons 1978

BELLINI-TOSI RADIOPHARE. A type of rotating beacon.

Reference: Keen 1938

DIRECTIONAL RADIO BEACON. Few details are offered in source. Sources in Part II note the A-N Radio Range is a Directional Beacon.

Reference: Finch 1938, Part II

EN-ROUTE VHF MARKER BEACONS (75 MHZ).

Classification #: 3525

Form of Device: Radio Aid to Navigation

Operation: VHF signals are transmitted to onboard receivers

Comments: Terms encompasses Fan Marker Beacon and Z Marker Beacon. Both of which give the appearance of obsolescence.

Reference: AT 1972, 1985

FAN-TYPE MARKER. This is possibly a descriptive term rather than an official term.

Reference: CAA-McKeel 1938

FAN MARKER. Replacement for "M" Marker in 1930s. This grew out of the

Z-Marker. It was VHF with fan-shaped transmissions. Messages were in Morse Code: two dashes for M. It was an En Route Aid.

Reference: Casabona 1959, CAA-FAP 1958, Whitnah 1966, Komons 1978

FAN MARKER BEACON. This Aid is a form of Radio Beacon. Transmissions have a pattern in a fan-shape.

Reference: Lexicon 1986; a variety of AT editions

FAN MARKER (FM). Term includes acronym. Few details for this variant form.

Reference: AIM 1991, IFH 1971

FIXED NON-DIRECTIVE MARINE BEACONS/NON-DIRECTIVE MARINE BEACON. Information from two or more devices can establish cross-bearings. Second term is equivalent of first term.

Reference: Keen 1938

LOW FREQUENCY NONDIRECTIONAL HOMING BEACON. Term only.

Reference: NOTAMS 1993

LOW-POWERED FAN MARKER/LOW-POWER VERSION OF THE FAN MARKER. A Marker employed for special purposes. Lower power reduced the level of interference with Z Markers.

References: AIM 1973, Casabona 1959 (2nd term)

LOW-POWER RADIO MARKER BEACON. A Radio Marker Beacon with Low-Power as part of name, or a descriptive addition by source?

Reference: Breniman 1970

“M” MARKER. An early En-Route Aid. It was designed to indicate distance between plane and Radio Range station. This allowed pilot to determine position. However, it was LF and too weak to be effective.

Reference: Komons 1978

MARCONI ROTATING BEAM TRANSMITTER/MARCONI ULTRA-SHORT WAVE ROTATING BEACON TRANSMITTER. A Beacon from the 1920s. It

employed ultra-short waves. Signals transmitted during aerial rotation. Bearing determined by strength of signals received. Maritime only?

Reference: Keen 1938

MARKER. This term is subject to various meanings. This specific usage is to Radio Marker Beacon. An early Aid that was attached to Radio Range. Radio Range gave directions but not position while Markers denoted position. Markers were nondirectional and short range.

Reference: Komons 1978

MARKER BEACON. There are two versions of this term: en route and terminal. It is in 75-MHz frequency and associated with ILS and Radio Range (though an obsolete or obsolescent Aid). Marker Beacons are of Four types: Fan Marker, Low-Powered Fan Marker, Z-Markers (or Station Location Marker), and ILS Marker Beacons. Casabona, speaks of both VHF and LF versions. AIM 1973 has en route and terminal forms.

References: AIM 1973, 1991, Casabona 1959

MARKER BEACON (MKR). This form is from a list of terms that includes acronym.

Reference: "Short Takes" I. AI 1992 a)

MARKER BEACON, 75 MHZ. Term adds frequency to basic name.

Reference: Interagency 1967

MARKER STATION. An informal descriptive term for Radio Range installation.

Reference: Whitnah 1966

NONDIRECTIONAL RADIO MARKER STATION. Few details available.

Possibly this is a Radio Beacon Station.

Reference: CAA 1945

NON-DIRECTIVE MARKER. = Non-directional Marker? Possible alternative for Non-directional Radio Marker Station.

Reference: Breniman 1970

ORFORDNESS EXPERIMENTAL ROTATING BEACON. A type of Rotating Beacon that employed the "Robinson frame system."

Reference: Keen 1938

RADIO BEACON. This term can have a clear meaning for marine navigation but less so in aero usage. For ICAO it is an overarching term that includes NDB, En Route VHF Marker Beacons. For some sources it has the meaning of Radio Range. Possibly it is a descriptive term for one or more aero Nav aids though without specificity in other sources.

References: AIM 1973, AIP 1991, Whitnah 1966, Finch 1938, Komons 1978, Solberg 1979, St. John Sprigg 1934

RADIO BEACON STATION. This may refer to a Radio Range installation with emphasis on physical apparatus and plant.

Reference: Komons 1978

RADIO MARKER. This term can have a specific meaning or it can have a less than specific meaning as given by various authors. For Komons this may be a Radio Range; for Whitnah it is possibly a Z Marker.

Reference: Komons 1978, Whitnah 1966

RADIO MARKER BEACON/RADIO-MARKER BEACON. A term that is seemingly specific in meaning yet becomes amorphous in practice. The hyphenated form may be a Radio Marker. Other possible meanings include Radio Range and Z Marker.

References: Finch 1938, Komons 1978, Whitnah 1966

RADIO-MARKER-BEACON STATION. For Casabona this is the fuller name for Marker Beacons.

Reference: Casabona 1959

R.A.F. DIRECTIVE TRANSMITTER. A type of Rotating Beacon. Employed for aerial navigation.

Reference: Keen 1938

ROTATING BEACON/ROTATING BEACON TRANSMITTER. Original form dates back to 1906. Approximate bearing information could be obtained from it. Further work in the 1930s and beyond by CAA eventually resulted in VOR. The second term refers to one form of Navigational Beacon that includes Telefunken Compass, Marconi Rotating Beam Transmitter, B-T Radiophare.
Reference: Kendal 1990, Keen 1938 (2nd term)

ROTATING BEACON WIRELESS TRANSMITTER. Term is a variant of Rotating Beacon Transmitter.
Reference: Keen 1938

ROTATING DIRECTIVE BEACON. A type of Navigational Beacon. Non-directional onboard receiver determined bearing by signals from Beacon. Maritime usage only?
Reference: Keen 1938

75 mc FAN MARKER. An En Route Aid. Term is frequently associated with Radio Range.
Reference: CAA-FAP 1958

75-MC MARKER SYSTEM. A reference to aids employing this frequency which include Z and Fan Markers.
Reference: Poritsky 1959

STATION LOCATION MARKERS. Seemingly an alternate name for the Z Marker.
Reference: Casabona 1959

ULTRA-HIGH-FREQUENCY RADIO FAN MARKER. Note: Ultra not Very. This refers to an experimental Aid from about 1938.
Reference: Keen 1938

VERTICAL MARKER BEACON. A form of transmitter employed in Radio Range installations in 1920s.

Reference: Bryan 1997

VERY-HIGH-FREQUENCY COURSE MARKER. Descriptive term rather than a formal name. Refers, at least in part, to Fan Marker.

Reference: Komons 1978

VERY-HIGH-FREQUENCY MARKER. This term can refer to both Fan and Z Markers but specific reference is only to Z Marker.

Reference: Komons 1978

V-H-F MARKERS. For Casabona this included Station Location Markers ("designation Z"), Fan Markers and Low Power Fan Marker.

Reference: Casabona 1959

VHF MARKER BEACON. For ICAO this seemingly refers to an En Route Fan Marker, or a Fan Marker for final descent. ICAO has a class of Aids known as En Route VHF Marker Beacons (75 MHz) which includes Fan and Z Markers.

Reference: AT 1952

Z-BEACONS. Variant term for Z Marker Beacon.

Reference: Kayton 1990

Z MARKER/Z-MARKER. An En-Route Aid that was added to the Four-Course Radio Range. It was designed to help pilots determine position at range. It transmitted VHF (75 mc) signals and activated sound and visual signals in airplane. It is also included with ILS.

Reference: Komons (2nd), AIM 1991 (1st), Poritsky 1959 (1st)

Z MARKER BEACON. A form of Radio Beacon. Transmissions are in shape of a vertical cone.

Reference: Lexicon 1986, AT 1972, 1085

3E3 Direction Finding Terms

General Note. Few D/F tems are listed in the 1st edition. However, additional

sources have substantially enlarged the DF category. DF systems can be viewed as both an En Route group as well as an Airport-related function. Historic terms encompass much of the segment.

DIRECTION-FINDING BEACON/DIRECTION FINDING BEACON/DF BEACON/OMNIDIRECTIONAL DF BEACON. An Aid that began in the late 1920s. It aided aircraft in determining location in relation to airport and to achieve nonprecision approach when in proximity to airport.

Reference: Kayton 1990

AERODROME D.F. Specific reference is calibration of equipment of such a unit. Possibly akin in meaning to Aircraft Ground Station D.F.

Reference: Keen 1938

GROUND D/F STATION. Overarching term for several systems including Bellini Tossi.

Reference: Kendal 1990

WIRELESS DIRECTION FINDING. Title of book by R. Keen which included the Lorenz Azimuth Guidance Beacon. The term encompasses Radio Aids but can also be extended to navigational systems internal to a mode of transportation outside of Aids.

Reference: Kendal 1990

WIRELESS BEACON LANDING SYSTEM. German system of the 1930s. Employs Wireless Marker Beacon that denotes route way. Aircraft used aural receivers and visual indicators. Relationship to other and newer systems unclear.

Reference: Pirath 1938

DIRECTION & POSITION FINDING. Refers to process of providing bearings to aircraft via coastal and aerodrome/airport ground stations.

Reference: Keen 1938

DIRECTION-FINDING STATIONS. Installations providing radio bearings that determine direction and position of aircraft.

Reference: Keen 1938

D.F. STATIONS. Short form of basic term.

Reference: Keen 1938

SHORE D.F. STATIONS/COASTAL D.F. STATIONS. Primarily for maritime use. Involves one or more units.

Reference: Keen 1938

AIRCRAFT GROUND D.F. STATIONS/GROUND STATION D.F. Airport-based unit. Often provides fixing information for long distance. Contrasts with shore stations that provide bearings occasionally and in thick weather.

Reference: Keen 1938

W/T DIRECTION FINDING STATION. Wireless transmitter installation that provides information on request.

Reference: Keen 1938

W/T FOG SIGNAL TRANSMITTER. Wireless transmitter employs submarine or "air sound" signal that operates simultaneous with wireless signal. Comparison of two signals gives fix. Maritime use only?

Reference: Keen 1938

QTG SIGNALS. Special transmissions from selected Coast W/T Stations for Direction Finding upon request. Marine use only? Note: QTG is part of Q Code in Civil Aeronautical Radio Service. QTG is a request for transmissions.

Reference: Keen 1938

WIRELESS BEACON TRANSMITTERS. Vessels with DF receivers can employ a wide range of Wireless Beacons including coastal and special wireless transmissions; sound signals were also available.

Reference: Keen 1938

WIRELESS POSITION FINDING. The process of employing wireless means for determining position. It includes use of ground stations by aircraft and onboard

use of data.

Reference: Keen 1938

WIRELESS DIRECTION FINDING. Term encompasses Radio Aids but can also include navigational system internal to mode of transportation that are outside Aids. Term from book title.

Reference: Keen 1938

SHORE GROUND STATION D.F./AIRCRAFT GROUND STATION D.F. Physical aspect of Aids (e.g. Bellini-Tosi). That system employs closed loop aerial or Adcock aerial. Rotating Loop D.F. also employed.

Reference: Keen 1938

SHORT-WAVE ADCOCK STATION. Keen focusses more on physical apparatus of the device. The specific terminology for the equipment is:

MARCONI-ADCOCK DISTANCE FINDING TYPE D.F. 12 SHIELDED
"U" TYPE AERIAL.

Reference: Keen 1938

SHORT-WAVE DIRECTION FINDING. In earlier phase of development the use of short-waves was largely for research. Further work resulted in a system that could be widely applied. Some early models included:

GROUND RAY D.F.

ROTATING FORM APPARATUS FOR SHORT-WAVE GROUND
RAY D.F.

MARCONI PORTABLE SHORT-WAVE D.F. TYPE D.F. G. 15

TELEFUNKEN GROUND RAY SHORT-WAVE PORTABLE D.F.
TYPE P 57N

Reference: Keen 1938

ROTATING SPACED FRAME SYSTEMS/ECKERSLEY-MARCONI
ROTATING FRAME APPARATUS. Terms suggest the physical apparatus for a D.F. unit. See previous terms.

Reference: Keen 1938

ROTATING LOOP D.F./B-T CLOSED LOOP SYSTEM/ADCOCK SYSTEM

DF systems in which type of aerial system is part of the name of the unit.

Reference: Keen 1938

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