

OGC CDB Core Model and Physical Structure Annexes (Best Practice)

Table of Contents

| | |
|---|----|
| 1. Scope | 6 |
| 2. Conformance | 8 |
| 3. References | 9 |
| 4. Terms and Definitions | 10 |
| 5. Conventions | 11 |
| 5.1. Identifiers | 11 |
| Annex A: Conformance Class Abstract Test Suite (Normative) | 12 |
| Annex B: Rationale: Sensor Simulation - Achieving Device-Independence | 13 |
| Annex C: Reasons for Using Jpeg | 15 |
| Annex F: Rationale: Partitioning the Earth into Tiles | 16 |
| Annex G: Rationale: Importance of Level of Detail | 19 |
| Annex H: Informative: JPEG | 21 |
| Annex I: Informative: ZipFile Format Notes | 22 |
| Annex J: Light Names and Hierarchy | 23 |
| Annex M: CDB Directory Naming and Structure | 34 |
| Annex O: List of Texture Component Selectors | 35 |
| Annex Q: Table of Dataset Codes | 48 |
| Annex R: Derived Datasets within the CDB | 51 |
| Annex S: Default Read and Write values for Simulator Client-Devices | 54 |
| Annex Y: Revision History | 56 |
| Annex Z: Bibliography | 57 |

Open Geospatial Consortium

Submission Date: 2020-01-21

Approval Date: 2020-xx-xx

Publication Date: 2020-xx-xx

External identifier of this OGC® document: <http://www.opengis.net/doc/BP/CDB-core-annexes/1.2>

Additional Formats (informative): 

Internal reference number of this OGC® document: 16-005r4

Version: 1.2

Category: OGC® Best Practice

Editor: Carl Reed

OGC CDB Core Model and Physical Structure Annexes (Best Practice)

Copyright notice

Copyright © 2020 Open Geospatial Consortium

To obtain additional rights of use, visit <http://www.opengeospatial.org/legal/>

Warning

This document defines an OGC Best Practices on a particular technology or approach related to an OGC standard. This document is **not** an OGC Standard and may not be referred to as an OGC Standard. It is subject to change without notice. However, this document is an **official** position of the OGC membership on this particular technology topic.

Document type: Draft OGC® Best Practice

Document subtype:

Document stage: Candidate

Document language: English

License Agreement

Permission is hereby granted by the Open Geospatial Consortium, ("Licensor"), free of charge and subject to the terms set forth below, to any person obtaining a copy of this Intellectual Property and any associated documentation, to deal in the Intellectual Property without restriction (except as set forth below), including without limitation the rights to implement, use, copy, modify, merge, publish, distribute, and/or sublicense copies of the Intellectual Property, and to permit persons to whom the Intellectual Property is furnished to do so, provided that all copyright notices on the intellectual property are retained intact and that each person to whom the Intellectual Property is furnished agrees to the terms of this Agreement.

If you modify the Intellectual Property, all copies of the modified Intellectual Property must include, in addition to the above copyright notice, a notice that the Intellectual Property includes modifications that have not been approved or adopted by LICENSOR.

THIS LICENSE IS A COPYRIGHT LICENSE ONLY, AND DOES NOT CONVEY ANY RIGHTS UNDER ANY PATENTS THAT MAY BE IN FORCE ANYWHERE IN THE WORLD.

THE INTELLECTUAL PROPERTY IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE DO NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE INTELLECTUAL PROPERTY WILL MEET YOUR REQUIREMENTS OR THAT THE OPERATION OF THE INTELLECTUAL PROPERTY WILL BE UNINTERRUPTED OR ERROR FREE. ANY USE OF THE INTELLECTUAL PROPERTY SHALL BE MADE ENTIRELY AT THE USER'S OWN RISK. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR ANY CONTRIBUTOR OF INTELLECTUAL PROPERTY RIGHTS TO THE INTELLECTUAL PROPERTY BE LIABLE FOR ANY CLAIM, OR ANY DIRECT, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM ANY ALLEGED INFRINGEMENT OR ANY LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR UNDER ANY OTHER LEGAL THEORY, ARISING OUT OF OR IN CONNECTION WITH THE IMPLEMENTATION, USE, COMMERCIALIZATION OR PERFORMANCE OF THIS INTELLECTUAL PROPERTY.

This license is effective until terminated. You may terminate it at any time by destroying the Intellectual Property together with all copies in any form. The license will also terminate if you fail to comply with any term or condition of this Agreement. Except as provided in the following sentence, no such termination of this license shall require the termination of any third party end-user sublicense to the Intellectual Property which is in force as of the date of notice of such termination. In addition, should the Intellectual Property, or the operation of the Intellectual Property, infringe, or in LICENSOR's sole opinion be likely to infringe, any patent, copyright, trademark or other right of a third party, you agree that LICENSOR, in its sole discretion, may terminate this license without any compensation or liability to you, your licensees or any other party. You agree upon termination of any kind to destroy or cause to be destroyed the Intellectual Property together with all copies in any form, whether held by you or by any third party.

Except as contained in this notice, the name of LICENSOR or of any other holder of a copyright in all or part of the Intellectual Property shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Intellectual Property without prior written authorization of LICENSOR or such copyright holder. LICENSOR is and shall at all times be the sole entity that may authorize

you or any third party to use certification marks, trademarks or other special designations to indicate compliance with any LICENSOR standards or specifications. This Agreement is governed by the laws of the Commonwealth of Massachusetts. The application to this Agreement of the United Nations Convention on Contracts for the International Sale of Goods is hereby expressly excluded. In the event any provision of this Agreement shall be deemed unenforceable, void or invalid, such provision shall be modified so as to make it valid and enforceable, and as so modified the entire Agreement shall remain in full force and effect. No decision, action or inaction by LICENSOR shall be construed to be a waiver of any rights or remedies available to it.

i. Abstract

This document provides the Annexes for the CDB Core: Model and Physical Structure Standard. The only exception is Annex A, Abstract Test Suite (ATS). The CDB ATS Annex is in Volume 1: Core document.

ii. Keywords

The following are keywords to be used by search engines and document catalogues.

ogcdoc, OGC document, ogcdoc, CDB, annexes

iii. Preface

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

iv. Submitting organizations

The following organizations submitted this Document to the Open Geospatial Consortium (OGC):

Organization name(s)

- CAE Inc.
- Carl Reed, OGC Individual Member
- Envitia, Ltd
- Glen Johnson, OGC Individual Member
- KaDSci, LLC
- Laval University
- Open Site Plan
- University of Calgary
- UK Met Office

The OGC CDB standard is based on and derived from an industry developed and maintained specification, which has been approved and published as OGC Document 15-003: OGC Common Data Base Volume 1 Main Body. An extensive listing of contributors to the legacy industry-led CDB specification is at Chapter 11, pp 475-476 in that OGC Best Practices Document (https://portal.opengeospatial.org/files/?artifact_id=61935).

v. Submitters

All questions regarding this submission should be directed to the editor or the submitters:

| Name | Affiliation |
|--------------|------------------------|
| Carl Reed | Carl Reed & Associates |
| David Graham | CAE Inc. |

Chapter 1. Scope

This document contains a number of annexes related to the OGC CDB Core standard.

For the purposes of being able to cross reference this OGC Best Practice with the previous versions of the CDB standard, the following annex “crosswalk” is provided.

| OGC Best Practice and CDB 3.2 | OGC CDB Standard Version 1.0 |
|-------------------------------------|---|
| Formerly Annex A10 in Volume 2 | Annex B Rationale: Sensor Simulation - Achieving Device-Independence |
| Main Body: Rationale for using JPEG | Annex C Reasons for Using JPEG |
| Formerly Annex B in Volume 2 | Annex D: TIFF Implementation Requirements |
| Formerly Annex D in Volume 2 | Annex E: ShapeFile dBASE III Guidance |
| Formerly Annex A.11 in Volume 2 | Annex F: Annex F Rationale: Partitioning the Earth into Tiles |
| Formerly Annex A.12 | Annex G Rationale: Importance of Level of Detail |
| Formerly Annex A.17 Volume 2 | Annex H: JPEG Informative annex |
| Was Annex U, Volume 2 | Annex I ZIP File Informative annex |
| Formerly Annex E, Volume 2 | Annex J: Light Hierarchy |
| Formerly Annex M, Volume 2 | Annex M: CDB Directory Naming and Structure |
| Formerly Annex O, Volume 2 | Annex O: List of Texture Component Selectors |
| Formerly Annex Q, Volume 2 | Annex Q: Table of Dataset Codes |
| Formerly Annex R, Volume 2 | Annex R: Derived Datasets within the CDB |
| Formerly Annex S, Volume 2 | Annex S: Default Read and Write values to be used by Simulator Client-Devices |

For ease of editing and review, the standard has been separated into 12 Volumes and a schema repository.

- Volume 0: OGC CDB Companion Primer for the CDB standard (Best Practice).
- Volume 1: OGC CDB Core Standard: Model and Physical Data Store Structure. The main body (core) of the CDB standard (Normative).
- Volume 2: OGC CDB Core Model and Physical Structure Annexes (Best Practice).
- Volume 3: OGC CDB Terms and Definitions (Normative).
- Volume 4: OGC CDB Rules for Encoding CDB Vector Data using Shapefiles (Best Practice).
- Volume 5: OGC CDB Radar Cross Section (RCS) Models (Best Practice).
- Volume 6: OGC CDB Rules for Encoding CDB Models using OpenFlight (Best Practice).
- Volume 7: OGC CDB Data Model Guidance (Best Practice).
- Volume 8: OGC CDB Spatial Reference System Guidance (Best Practice).
- Volume 9: OGC CDB Schema Package: <http://schemas.opengis.net/cdb/> provides the normative schemas for key features types required in the synthetic modelling environment. Essentially,

these schemas are designed to enable semantic interoperability within the simulation context (Normative).

- Volume 10: OGC CDB Implementation Guidance (Best Practice).
- Volume 11: OGC CDB Core Standard Conceptual Model (Normative).
- Volume 12: OGC CDB Navais Attribution and Navais Attribution Enumeration Values (Best Practice).
- Volume 13: OGC CDB Rules for Encoding CDB Vector Data using GeoPackage (Normative, Optional Extension).
- Volume 14: OGC CDB Guidance on Conversion of CDB Shapefiles into CDB GeoPackages (Best Practice).
- Volume 15: OGC CDB Optional Multi-Spectral Imagery Extension (Normative).

Chapter 2. Conformance

This section is not applicable to this document.

Chapter 3. References

The following normative documents contain provisions that, through reference in this text, constitute provisions of this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

Chapter 4. Terms and Definitions

This document uses the terms defined in Sub-clause 5.3 of [OGC 06-121r8], which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this Best Practice.

Other Terms and Definitions may be found in Volume 3: OGC CDB Terms and Definitions (normative) of Best Practice.

Chapter 5. Conventions

This section provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of XML schema, or special notes regarding how to read the document.

5.1. Identifiers

The normative provisions in this Best Practice are denoted by the URI

<http://www.opengis.net/spec/CDB/1.0/annexes>

All requirements and conformance tests that appear in this document are denoted by partial URIs which are relative to this base.

Annex A: Conformance Class Abstract Test Suite (Normative)

Not applicable for this document.

Annex B: Rationale: Sensor Simulation - Achieving Device-Independence

Formerly Annex A10 in Volume 2

One of the primary objectives of the CDB Standard is to provide and integrate all of the data required by all sensor devices, not just Image Generators producing the Out the Window (OTW) scenes. The purpose of this integration, among other things, is to achieve and maintain a high level of correlation among the many client-devices (subsystems) within a simulator. Furthermore, this integration must be done independently of the client-device or the sensor type, with little or no duplication of data amongst clients. In addition to the OTW, many simulator client-devices are required to simulate the synthetic environment over different portions of the electromagnetic spectrum, infrared (e.g. FLIR, NVG), microwaves (e.g. radar), audio (e.g. sonar), etc. Up to now, the current state of the art approaches to the simulation of sensors has typically been quite proprietary to the client-device implementation of the various vendors. There have been no universally accepted simulation models suitable for use in simulation.

Sensor simulation typically requires a simulation of the device itself, supplemented by a complete simulation of the synthetic environment over the portion of the electromagnetic spectrum that is relevant to this device. The former simulation is referred to as the **Sensor Simulation Model (SSM)** while the latter is called the **Sensor Environmental Model (SEM)**. In the past, the SEM relied heavily on environmental databases whose content was designed to match the functionality, fidelity, structure and format requirements of the SEM. The level of realism possible by the SEM depended **heavily** on the quality, quantity and completeness of the data available. The environmental database was highly device-specific and could not be readily ported to other platforms.

A SEM is usually based on mathematical model of the environment for the portion of the electromagnetic spectrum of interest. The SEM acts much as a black box that produces a response in accordance to input data. A significant portion of this data must come from the CDB; however, the key is to segregate all device-dependent data and all SEM-dependent data from the modeling data that represents the synthetic environment. In order to accommodate the most different kind of sensors possible, a common denominator must be chosen. In the CDB standard, this common denominator is called a material. This is the subject of this annex.

One of the fundamental issues of sensor simulation involves the handling of material properties. As discussed earlier, the determination of which material properties should be supported heavily depends on:

1. the sensor types to be supported;
2. the vendors' sensor simulation implementations to be supported; and
3. the level of fidelity, functionality and precision of the SEMs to be supported.

Clearly, the task of determining a definitive list of material properties that would accommodate all of the above requirements for the today's sensor types, vendor implementations and SEMs would be a significant challenge. Furthermore, once released, the materials properties would limit any SEM innovation by the industry. As a result, the CDB Standard limits its jurisdiction over the material properties.

Instead, the CDB standard defines and publicly defines a list of materials that can be used in a CDB. It is the responsibility of each vendor to define the properties (that satisfies the sensor type) for these CDB materials. As a result, vendors are totally free to select material properties that satisfy the fidelity, functionality and precision requirements of the SEM for the sensor type of interest. Alternately, if the vendors have their own list of materials, they can create a mapping between CDB materials and their internally supported list of materials. This approach allows client-devices to retain their SEMs as well as their own sets of material properties.

The materials.xsd and materials.xml schema in the CDB schema package enumerates the base materials supported by this standard.

Annex C: Reasons for Using Jpeg

(Formerly from body of Best Practice Volume 1)

The CDB Standard prescribes the use of an industry standard compression algorithm for its storage intensive raster imagery datasets. This not only provides a substantial reduction in storage, but also reduces the data transmission bandwidths associated with simulator's access to the synthetic environment database at runtime. As a result of its storage efficiency, the CDB Standard relies on relatively few data formats for storing its datasets. There is no benefit (other than storage efficiency) to be gained in supporting any other specialized data formats whose underlying objective is only for storage efficiency. The CDB Standard embodies the JPEG 2000 industry standard format for raster imagery because it has comparable storage efficiency to all of these image formats without sacrificing any generality. JPEG 2000 has been chosen by the CDB Standard as a format for the storage of OTW raster imagery because of the following characteristics.

1. High compression efficiency: Compression better than 0.25 bits per pixels. Virtually indiscernible loss in image quality for 10:1 – 20:1 compression.
2. Lossless and lossy compression: Lossless compression ratios approx. 1.7:1
3. Perceptual color space internal coding: Allow dark images to be reconstructed without banding artifacts.
4. High dynamic range: Compress and decompress images with various dynamic ranges (e.g., 1-bit to 16-bit) for each color component.
5. Large images sizes: Up to $(2^{32} - 1)$

There are other characteristics of the JPEG 2000 that are worth mentioning but are not directly beneficial to the CDB Standard. Those are:

1. Progressive image reconstruction: Allow images to be reconstructed with increasing pixel accuracy and resolution.
2. Region of interest coding: Permits certain Region of Interest (ROI's) in the image to be coded and transmitted with better quality and less distortion than the rest of the image.
3. Seamless quality and resolution scalability: Without having to download the entire file
4. Error resilience during transfers.

JPEG 2000 will be solely targeted at Raster Imagery data only. The reason is simply because of its highly efficient compression scheme that fits well with the goal of reducing the huge datasets associated with Imagery. Other raster-based datasets defined in the CDB will solely be using the TIFF format due to their more manageable size.

Annex F: Rationale: Partitioning the Earth into Tiles

Formerly Appendix A11 in Volume 2 of the CDB Best Practice.

This section provides rationale for partitioning the world into tiles.

The design of the CDB standard tile representation is centered on three primary considerations.

1. A tile representation comprehensive enough to accommodate the entire earth.
2. A tile representation that lends itself to real-time implementation by a CDB system and all of its attached simulator client-devices.

A numerically straightforward mapping (such as a simple scaling) to map lat-long coordinates into CDB coordinates and vice versa is highly desirable for real-time implementation considerations.

3. A tile representation with a system of units that conforms as much as possible to geographic standards.

One of the underlying motivations driving the CDB tile representation is the need for a system that will remain as close to the raw source data as possible which currently is DTED and GeoTIFF; DTED uses a geographic coordinate system defined by latitudes and longitudes. The basic unit in DTED is a geo-cell, which always has a height and width of one degree. In order to maintain a density of data that does not increase inordinately when moving towards the poles, the grid post intervals (measured in degrees or arc-sec) along the longitudinal axis are increased at specific latitudes; for instance, at DTED level 2, the latitude interval is always one second of arc but the longitude interval is one second of arc at latitudes from 0 to 50 degrees, from latitudes 50 to 70 the interval is two arc seconds and so on as shown in Table A-3.

INTERVALS FOR DTED LEVEL 2.

Table A-3. INTERVALS FOR DTED LEVEL 2

| DTED Zone | Latitude Range (Degrees) | Latitude Interval (Arc seconds) | Longitude Interval (Arc seconds) |
|-----------|--------------------------|---------------------------------|----------------------------------|
| I | 0 – 50 N-S | 1 | 1 |
| II | 50 – 70 N-S | 1 | 2 |
| III | 70 – 75 N-S | 1 | 3 |
| IV | 75 – 80 N-S | 1 | 4 |
| V | 80 – 90 N-S | 1 | 6 |

Before going into the detailed design of the CDB tile representation, it is worth stating the guiding principles that constrain the approach used by the CDB tile representation.

1. The earth model is divided (in latitude) into slices.
2. The slice's x-axis is aligned to WGS-84 lines of latitude.

3. The slice's y-axis is aligned to WGS-84 lines of longitude.
4. The number of units along the slice's y-axis for a given level of detail is the same for all slices.

The earth surface geodetic dimension in arc-second of y-axis units within an earth slice and in all earth slices is exactly the same, regardless of latitude.

5. The geodetic dimension of an x-axis unit in arc-second is constant within a zone, but is re-defined at pre-selected latitudes to achieve a greater level of spatial sampling uniformity in all tiles; this overcomes the narrowing effect of increased latitudes on longitudinal distances. The definition of zones in the CDB is the same as those in DTED (with the exception of the poles).
6. The number of units along the slice's x-axis for a given level of detail is the same within each zone.
7. The number of units along the slice's y-axis is constrained to a 2^n -multiple in all slices.

Many simulator client devices impose constraints related to the run-time use of binary pyramidal structures (such as mip-maps, quadtrees, etc.). A binary pyramidal structure is simply a collection of two-dimensional arrays; each array represents the same content but at successively finer levels of resolution.

8. The number of units along the slice's x-axis will vary depending on which zone the latitude of the slice belongs. At this point we introduce the concept of a CDB Geocell, which differs slightly from a DTED Geocell. A DTED cell is always 1×1 degrees. In contrast, a CDBGeocell always has a height of 1 degree but has a varying width depending on its latitude. Table A-4. Size of CDB Geocell per zone shows the dimensions of a CDB Geocell per zones of latitude. For instance, in latitude zone 5, which goes from -50 to 50 degrees latitude, a CDB Geocell is 1×1 degree, in zone 4 and 6 which goes from latitude 50 to 70 degrees the cell size is 1×2 degrees. The main reason to introduce this concept is to maintain a reasonable eccentricity between the sides by trying to keep them as close to a square as possible. Two criteria are used to define the size of a CDB Geocell.

1. A CDB Geocell must contain a whole number of DTED Geocells; in other words a CDB Geocell must start and end on a whole degree along the longitudinal axis. This is done so as to facilitate mapping from CDB Geocells to DTED Geocells.
2. The length of the CDB Geocell must be a whole factor of 180, in other words length of 1, 2, 3, 4, 6 and 12 degrees are legal but lengths of 7 and 8 degrees would not be since these are not exact factors of 180.

Table A-4. Size of CDB Geocell per zone

| CDB Zone | Latitude Range (Degrees) | CDBGeocell size (deg Lat \times deg Lon)) | Number of DTED Geocells |
|----------|-----------------------------|---|-------------------------|
| 0 | $-90 \leq \text{lat} < -89$ | 1 X 12 | 12 |
| 1 | $-89 \leq \text{lat} < -80$ | 1 X 6 | 6 |
| 2 | $-80 \leq \text{lat} < -75$ | 1 X 4 | 4 |
| 3 | $-75 \leq \text{lat} < -70$ | 1 X 3 | 3 |
| 4 | $-70 \leq \text{lat} < -50$ | 1 X 2 | 2 |

| CDB Zone | Latitude Range (Degrees) | CDBGeocell size (deg Lat × deg Lon) | Number of DTED Geocells |
|-----------------|---------------------------------|--|--------------------------------|
| 5 | $-50 \leq \text{lat} < +50$ | 1 X 1 | 1 |
| 6 | $+50 \leq \text{lat} < +70$ | 1 x 2 | 2 |
| 7 | $+70 \leq \text{lat} < +75$ | 1 x 3 | 3 |
| 8 | $+75 \leq \text{lat} < +80$ | 1 x 4 | 4 |
| 9 | $+80 \leq \text{lat} < +89$ | 1 x 6 | 6 |
| 10 | $+89 \leq \text{lat} < +90$ | 1 x 12 | 12 |

The variable CDB Geocell size in the CDB standard has the following benefits.

1. Reduces the simulator client processing overheads associated with the switching from one zone to another. (Due to the small number of zones across the earth.)
2. Reduces the variation of longitudinal dimensions (in meters) to a maximum of 50%.
3. Improves storage efficiency.

Annex G: Rationale: Importance of Level of Detail

Formerly Appendix A-12 of Volume 2 of the OGC CDB Best Practice.

The availability of LODs for most datasets is critical for real-time performance. Many simulator client-devices can readily take advantage of an LOD structure because many clients naturally require less detail with increasing distance away from the simulated own ship position. For example, the projection of screen pixels (i.e. pixels in an IG image plane) onto near-field terrain subtends much less area than the projection of screen pixel onto far-field terrain near the horizon; as a result, much less detail is required at far range. In addition, clients may need to revert to an alternate coarser representation if they cannot cope with the paging bandwidths, memory footprint or computational requirements of finer LODs. This provides a solid basis on which client-devices can build paging managers, load management and memory management algorithms.

The following example illustrates the important performance considerations and the inherent performance advantage that can be achieved with an LOD structure. Consider a simulator client-device, with a capability to display terrain imagery out to 128 km; the imagery is 1m at its finest available resolution and the simulated ownship is flying at 100 m/s. Under these conditions, and without the benefit of an LOD organization (as illustrated in [Figure A-15: Paging of Terrain Imagery without an LOD Structure](#)), the client-device would require access to the imagery at a rate of ~100 Mpixels/sec. Consider on the other hand the same operating conditions but with the client-device accessing LOD-organized imagery (as illustrated in [Figure A-14: Paging of Terrain Imagery with an LOD Structure](#)). Furthermore, assume that the client-device only requires 1m imagery for ranges less than 1/2 km, 2m for ranges less than 1km, 4m for ranges less than 2km, and so on. With the benefit of an LOD structure, the client-device would require access to the imagery at a much lower rate of ~1 Mpixels/sec, reducing access bandwidth by a factor of ~100x over the non-LOD approach. Clearly, such performance gains cannot be ignored for real-time applications such as flight simulators, especially when one realizes that access bandwidth increases as the square of the imagery resolution.

In addition to a reduction in access bandwidth, the LOD structure also benefits simulator client-devices that have a requirement to dynamically filter the data to control aliasing. In effect, part of the client-device filtering process is relegated to an off-line process.

The CDB standard does not enforce, nor does it specify the type of filter used to compute the data element values of raster-organized or list-organized datasets. Yet, it is clear that inadequate off-line filter may affect the rendering quality of the affected client-devices. As a result, the CDB standard provides guidelines to govern the quality of the off-line LOD process; these guidelines are provided with each of the raster-organized dataset (or list-organized datasets in future releases of the CDB standard).

Figure A-14: Paging of Terrain Imagery with an LOD Structure



Figure A-15: Paging of Terrain Imagery without an LOD Structure



Annex H: Informative: JPEG

Formerly Appendix A.17 in Volume 2 of the OGC CDB Best Practice

The CDB standard supports JPEG2000 for both VSTI and VSTLM component data.

As a result of the high rates of compression there are no real advantages to be gained in supporting a broad range of alternate color representations (such as single channel representations, indexed color representations, RGB-triplet color encoding such as 5-6-5, etc.). The underlying motivation behind all such schemes is driven by a desire to reduce storage and transmission bandwidths. JPEG-2000 achieves these goals and many others, refer to Table A-8 JPEG 2000 Features.

Table A-8 JPEG 2000 Features

| | |
|---|--|
| High compression efficiency: Compression better than 0.25 bits per pixels, 20% compression efficiency improvement over JPEG. | High dynamic range: Compress images with various dynamic ranges (e.g. 1-16 bit) for each color component. |
| Lossless and lossy compression: Lossless compression ratios approx. 1.7:1. | Seamless quality / resolution scalability: Without having to download the entire file. |
| Progressive image reconstruction: Allows images to be reconstructed with increasing pixel accuracy and resolution. | Large images sizes - up to $(2^{32} - 1)$. |
| Perceptual color space internal coding. | Single decompression architecture. |
| Region of interest coding: Permits certain ROI's in the image to be coded and transmitted with better quality and less distortion than the rest of the image. | Error resilience during transfers. |

Annex I: Informative: ZipFile Format Notes

Formerly Annex U in Volume 2 of the OGC CDB Best Practice

The archive zip format used in the CDB standard is based on

APPNOTE.TXT - .ZIP File Format Specification

URL: <http://www.pkware.com/documents/APPNOTE/APPNOTE-6.3.1.TXT>

Version: 6.3.1

Revised: April 11, 2007

Copyright (c) 1989 - 2007 PKWARE Inc., All Rights Reserved.

The use of certain technological aspects disclosed in the current APPNOTE is available pursuant to the below section entitled "Incorporating PKWARE Proprietary Technology into Your Product".

CDB zip compliant reader is required to support as a minimum the following features defined in APPNOTE.TXT:

- Local file header (Note: Extra field can be inserted but not required to be read)
- File data
- Data descriptor:
- Central directory structure (Note: Digital signature is supported but will not be read)
- End of central directory record: (Note: ZIP file comments are supported but will not be read)

The compression methods supported:

- No compression
- Deflate (Enhanced Deflate is not required to be supported)

The following features are not required to be supported thus are optional and left to the implementation:

- Archive decryption header
- Archive extra data record.
- Zip64 end of central directory record
- Zip64 end of central directory locator
- Splitting and Spanning ZIP files
- Encryptions of any type

Note that anything not listed in this section is by default assumed not to be supported.

Annex J: Light Names and Hierarchy

| | Light Hierarchy | v5.0 Light Code | v5.1 Light Code | Light Code | Description | IR Wavelength (nm) | Color (normalized RGB) | Directionality (deg) | IR Wavelength (nm) | IR Wavelength (nm) | IR Wavelength (nm) | IR Wavelength (nm) | Frequency (Hz) | IR Wavelength (nm) |
|----|-----------------------|-----------------|-----------------|------------|---|--------------------|------------------------|----------------------|--------------------|--------------------|--------------------|--------------------|----------------|--------------------|
| 1 | Light | 0 | 0 | 0 | All purpose generic Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 2 | Platform | 1 | 1 | 1 | Generic Platform Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 3 | Air | 2 | 2 | 2 | Generic Aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 4 | Aircraft Helix | 3 | 3 | 3 | Generic Light for Aircraft and Helicopters | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 5 | Anti-collision | 4 | 4 | 4 | Generic Anti-collision Light - normally red flashing | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 6 | Bottom Light | 5 | 5 | 5 | Anti-collision found on bottom of the fuselage | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 7 | NVG Bottom Light | 6 | 6 | 6 | Anti-collision found on bottom of the fuselage in NVG Mode | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 8 | Top Light | 7 | 7 | 7 | Anti-collision found on Top of the fuselage | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 9 | NVG Top Light | 8 | 8 | 8 | Anti-collision found on Top of the fuselage in NVG Mode | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 10 | High Intensity | 501 | 501 | 501 | High Intensity Anti-collision Light | 0.95 | 1 0 0 | Omni | — | — | — | 0.7 | 0.25 | — |
| 11 | Formation Light | 9 | 9 | 9 | Fluorescent formation strip Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 12 | Flood Light | 10 | 10 | 10 | White Flood Lights used to illuminate the ground or part of the aircraft | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 13 | Head Light | 11 | 11 | 11 | Head Light used to allow pilots to see ahead | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 14 | Identification Strobe | 12 | 12 | 12 | Generic Strobe Lights used in flight to indicate position | 0.6 | 1 1 1 | Omni | — | — | — | 1 | 0.05 | — |
| 15 | Red Light | 13 | 13 | 13 | Red identification strobe Light | 0.6 | 1 0 0 | Omni | — | — | — | 1 | 0.05 | — |
| 16 | White Light | 14 | 14 | 14 | White identification strobe Light | 0.6 | 1 1 1 | Omni | — | — | — | 1 | 0.05 | — |
| 17 | IR Light | 15 | 15 | 15 | Infrared Lights used to indicate position using infrared instruments | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 18 | Landing Light | 16 | 16 | 16 | White Lights used on Landing approach | 0.6 | 1 1 1 | Dir | 60 | 60 | — | — | — | — |
| 19 | Navigation | 17 | 17 | 17 | Generic Lights used in flight to indicate position | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 20 | Red Light | 18 | 18 | 18 | Red Navigation Light found on the left wing | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |
| 21 | Flashing Red Light | 502 | 502 | 502 | Flashing Red Navigation Light found on the left wing | 0.6 | 1 0 0 | Omni | — | — | — | 1 | 0.5 | — |
| 22 | Green Light | 19 | 19 | 19 | Green Navigation Light found on the right wing | 0.6 | 0 1 0 | Omni | — | — | — | — | — | — |
| 23 | Flashing Green Light | 503 | 503 | 503 | Flashing Green Navigation Light found on the right wing | 0.6 | 0 1 0 | Omni | — | — | — | 1 | 0.5 | — |
| 24 | White Light | 20 | 20 | 20 | White Navigation Light found on the tail wing | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 25 | Flashing White Light | 504 | 504 | 504 | Flashing White Navigation Light found on the tail wing | 0.6 | 1 1 1 | Omni | — | — | — | 1 | 0.5 | — |
| 26 | NVG Light | 21 | 21 | 21 | Navigation Light used in NVG Mode | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 27 | Tail Light | 22 | 22 | 22 | White Tail Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 28 | Tail Flood | 23 | 23 | 23 | Flood Light used to illuminate the tail, showing off the logo or markings | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 29 | Taxi Light | 24 | 24 | 24 | White Lights used when Aircraft taxi on the ground | 0.6 | 1 1 1 | Dir | 40 | 40 | — | — | — | — |
| 30 | Wingtip Obstruction | 25 | 25 | 25 | Generic Wingtip obstruction Light | 0.6 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 | — |
| 31 | Red Light | 26 | 26 | 26 | Red Obstruction Light found on left wing | 0.6 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 | — |
| 32 | Green Light | 27 | 27 | 27 | Green Obstruction Light found on right wing | 0.6 | 0 1 0 | Omni | — | — | — | 0.5 | 0.33 | — |
| 33 | Civil | 28 | 28 | 28 | Generic Civil aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 34 | Business | 29 | 29 | 29 | | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 35 | Regional | 30 | 30 | 30 | | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 36 | Transport | 31 | 31 | 31 | | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 37 | Workbody | 32 | 32 | 32 | | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 38 | Military | 33 | 33 | 33 | Generic Military aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 39 | Cargo Light | 34 | 34 | 34 | Cargo Light | 0.6 | 1 1 1 | Dir | 180 | 60 | — | — | — | — |
| 40 | IR | 35 | 35 | 35 | Infrared Cargo Light | 0.6 | 1 1 1 | Dir | 180 | 60 | — | — | — | — |
| 41 | Refueling Light | 36 | 36 | 36 | Refueling Light | 0.6 | 1 1 1 | Dir | 60 | 60 | — | — | — | — |
| 42 | Search Light | 37 | 37 | 37 | Search Light | 0.9 | 1 1 1 | Dir | 10 | 10 | — | — | — | — |
| 43 | NVG Light | 38 | 38 | 38 | Search Light used in NVG Mode | 0.9 | 1 1 1 | Dir | 10 | 10 | — | — | — | — |
| 44 | ASW Patrol | 39 | 39 | 39 | Generic ASW Patrol Aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 45 | Bomber | 40 | 40 | 40 | Generic Bomber Aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 46 | Cargo Tanker | 41 | 41 | 41 | Generic Cargo Tanker Aircraft Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 47 | Pod Light | 425 | 425 | 425 | Generic Pod Lights on Cargo Tanker | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 48 | Starboard | 426 | 426 | 426 | Generic Starboard Pod Lights on Cargo Tanker | 0.6 | 1 1 1 | Omni | — | — | — | — | — | — |
| 49 | Green Light | 427 | 427 | 427 | Green Light All of Starboard pod | 0.6 | 0 1 0 | Omni | — | — | — | — | — | — |
| 50 | Red Light | 428 | 428 | 428 | Red Light All of Starboard pod | 0.6 | 1 0 0 | Omni | — | — | — | — | — | — |

| | Light Hierarchy | V3.0 Light Code | V3.1 Light Code | Light Code | Description | Intensity (normalized) | Color (normalized RGB) | Directionality type | Width (degrees) | Height (degrees) | Intensity (normalized) | Frequency (Hz) | Duty Cycle (normalized) |
|-----|--------------------------|-----------------|-----------------|------------|--|------------------------|------------------------|---------------------|-----------------|------------------|------------------------|----------------|-------------------------|
| 51 | Yellow_Light | 429 | 470 | 470 | Yellow Light Aft of Starboard pod | 0.6 | 1 1 0 | Omit | — | — | — | — | — |
| 52 | Port | 430 | 471 | 471 | Generic Port Pod Lights on Cargo Tanker | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 53 | Green_Light | 431 | 472 | 472 | Green Light Aft of Port pod | 0.6 | 0 1 0 | Omit | — | — | — | — | — |
| 54 | Red_Light | 432 | 473 | 473 | Red Light Aft of Port pod | 0.6 | 1 0 0 | Omit | — | — | — | — | — |
| 55 | Yellow_Light | 433 | 474 | 474 | Yellow Light Aft of Port pod | 0.6 | 1 1 0 | Omit | — | — | — | — | — |
| 56 | Aldus_Light | 434 | 475 | 475 | Generic Aldus Lights on Cargo Tanker | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 57 | Starboard | 435 | 476 | 476 | Generic Starboard Aldus Lights on Cargo Tanker | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 58 | Amber_Light | 436 | 477 | 477 | Amber aldus Light at Starboard Aft door | 0.6 | 1 0.6 0 | Omit | — | — | — | — | — |
| 59 | Green_Light | 437 | 478 | 478 | Green aldus Light at Starboard Aft door | 0.6 | 0 1 0 | Omit | — | — | — | — | — |
| 60 | Red_Light | 438 | 479 | 479 | Red aldus Light at Starboard Aft door | 0.6 | 1 0 0 | Omit | — | — | — | — | — |
| 61 | Yellow_Light | 439 | 480 | 480 | Yellow aldus Light at Starboard Aft door | 0.6 | 1 1 0 | Omit | — | — | — | — | — |
| 62 | Port | 440 | 481 | 481 | Generic Port Aldus Lights on Cargo Tanker | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 63 | Amber_Light | 441 | 482 | 482 | Amber aldus Light at Port Aft door | 0.6 | 1 0.6 0 | Omit | — | — | — | — | — |
| 64 | Green_Light | 442 | 483 | 483 | Green aldus Light at Port Aft door | 0.6 | 0 1 0 | Omit | — | — | — | — | — |
| 65 | Red_Light | 443 | 484 | 484 | Red aldus Light at Port Aft door | 0.6 | 1 0 0 | Omit | — | — | — | — | — |
| 66 | Yellow_Light | 444 | 485 | 485 | Yellow aldus Light at Port Aft door | 0.6 | 1 1 0 | Omit | — | — | — | — | — |
| 67 | Fighter | 42 | 42 | 42 | Generic Fighter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 68 | Helicopter | 43 | 43 | 43 | Specific Military Helicopter Lights | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 69 | Slung_Load_Light | 44 | 44 | 44 | Light used to illuminate objects carried on a slung load | 0.7 | 1 1 1 | Omit | — | — | — | — | — |
| 70 | Attack | 45 | 45 | 45 | Generic Attack Helicopter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 71 | Cargo | 46 | 46 | 46 | Generic Cargo Helicopter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 72 | Special_Ops | 47 | 47 | 47 | Generic Special-Ops Helicopter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 73 | MH-47E | 445 | 486 | 486 | Generic Special-Ops MH-47E Helicopter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 74 | Porch_Light | 446 | 487 | 487 | Lower White on bottom of Aft pylon near exhaust | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 75 | Utility | 48 | 48 | 48 | Generic Utility Helicopter Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 76 | Tanker | 49 | 49 | 49 | Generic Tanker Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 77 | Unmanned | 50 | 50 | 50 | Generic Military Unmanned Aerial Vehicle (UAV) Lights | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 78 | Navigation | | 484 | 484 | Generic Nav Lights on UAVs to indicate position | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 79 | Red_Light | | 485 | 485 | Red navigation Light found on left wing | 0.6 | 1 0 0 | Omit | — | — | — | — | — |
| 80 | Green_Light | | 486 | 486 | Green navigation Light found on right wing | 0.6 | 0 1 0 | Omit | — | — | — | — | — |
| 81 | White_Light | | 487 | 487 | White navigation Light usually on the tail | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 82 | Position | | 488 | 488 | Generic Position Lights on UAVs to indicate position | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 83 | Orange_Light | | 489 | 489 | Orange position Light | 0.6 | 1 0.6 0 | Omit | — | — | — | — | — |
| 84 | White_Light | | 500 | 500 | White position Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 85 | Land | 51 | 51 | 51 | Generic Land Vehicle Light | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 86 | Backup_Light | 52 | 52 | 52 | White Lights that indicate a vehicle backing up | 0.3 | 1 1 1 | Omit | — | — | — | — | — |
| 87 | Blinking_Emergency_Light | 53 | 53 | 53 | Yellow flashing emergency Lights (i.e. 4-way flashing indicator Light) | 0.4 | 1 1 0 | Omit | — | — | — | 0.5 | 0.5 |
| 88 | Blinking_Turn_Light | 54 | 54 | 54 | Yellow blinking turning indicator Light | 0.4 | 1 1 0 | Omit | — | — | — | 0.5 | 0.5 |
| 89 | Brake_Light | 55 | 55 | 55 | Red Lights when brakes are applied | 0.4 | 1 0 0 | Omit | — | — | — | — | — |
| 90 | Headlight | 56 | 56 | 56 | Generic Headlight on a Land Vehicle that allow a driver to see ahead | 0.5 | 1 1 1 | Omit | — | — | — | — | — |
| 91 | Low_Beam_Light | 57 | 57 | 57 | Low beam head Lights | 0.5 | 1 1 1 | Omit | — | — | — | — | — |
| 92 | High_Beam_Light | 58 | 58 | 58 | High beam head Lights | 0.6 | 1 1 1 | Omit | — | — | — | — | — |
| 93 | Perimeter_Amber_Light | 59 | 59 | 59 | Perimeter Lights | 0.4 | 1 0.6 0 | Omit | — | — | — | — | — |
| 94 | Strobing_Blue_Light | 60 | 60 | 60 | Blue strobe (Flashing) | 0.5 | 0 0 1 | Omit | — | — | — | 1 | 0.05 |
| 95 | Strobing_Red_Light | 61 | 61 | 61 | Red strobe (Flashing) | 0.5 | 1 0 0 | Omit | — | — | — | 1 | 0.05 |
| 96 | Strobing_White_Light | 62 | 62 | 62 | White Strobe (Flashing) | 0.5 | 1 1 1 | Omit | — | — | — | 1 | 0.05 |
| 97 | Strobing_Yellow_Light | 63 | 63 | 63 | Yellow Strobe (Flashing) | 0.5 | 1 1 0 | Omit | — | — | — | 1 | 0.05 |
| 98 | Tail_Light | 64 | 64 | 64 | Red tail Lights | 0.4 | 1 0 0 | Omit | — | — | — | — | — |
| 99 | Turn_Signal_Light | 65 | 65 | 65 | Yellow turning indicator Light | 0.4 | 1 1 0 | Omit | — | — | — | — | — |
| 100 | Car | 66 | 66 | 66 | Generic Car Lights | 0.4 | 1 1 1 | Omit | — | — | — | — | — |

| | Light Hierarchy | V0.0 Light Code | V3.1 Light Code | Light Code | Description | Intensity (normalized) | Color (normalized RGB) | Directionality (type) | Width_Hor (degrees) | Width_Vert (degrees) | Intensity_Ret (normalized) | Frequency (Hz) | Duty_Cycle (normalized) |
|-----|--------------------|-----------------|-----------------|------------|---|------------------------|------------------------|-----------------------|---------------------|----------------------|----------------------------|----------------|-------------------------|
| 101 | Transport_Van | 67 | 67 | 67 | Generic Transport Lights | 0.4 | 1 1 1 | Omn | — | — | — | — | — |
| 102 | Truck | 68 | 68 | 68 | Generic Truck Lights | 0.4 | 1 1 1 | Omn | — | — | — | — | — |
| 103 | Ambulance | 69 | 69 | 69 | Generic Ambulance Lights | 0.4 | 1 1 1 | Omn | — | — | — | — | — |
| 104 | Firetruck | 70 | 70 | 70 | Generic Fire Truck Lights | 0.4 | 1 1 1 | Omn | — | — | — | — | — |
| 105 | Train | 71 | 71 | 71 | Generic Train Lights | 0.4 | 1 1 1 | Omn | — | — | — | — | — |
| 106 | Caboose Rear Light | 72 | 72 | 72 | Caboose red light at rear of train | 0.4 | 1 0 0 | Omn | — | — | — | — | — |
| 107 | Engine Head Light | 73 | 73 | 73 | Train engine white head light | 0.7 | 1 1 1 | Omn | — | — | — | — | — |
| 108 | Tank | 74 | 74 | 74 | Generic Tank Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 109 | Surface | 75 | 75 | 75 | Generic Surface Vehicle Light | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 110 | Boat | 76 | 76 | 76 | Generic Boat Lights found on a Surface Vehicle | 0.6 | 1 1 1 | Omn | — | — | — | 0.22 | 0.5 |
| 111 | Green Light | 77 | 77 | 77 | Green Boat Light | 0.6 | 0 1 0 | Omn | — | — | — | 0.22 | 0.5 |
| 112 | Red Light | 78 | 78 | 78 | Red Boat Light | 0.6 | 1 0 0 | Omn | — | — | — | 0.22 | 0.5 |
| 113 | White Light | 79 | 79 | 79 | White Boat Light | 0.6 | 1 1 1 | Omn | — | — | — | 0.22 | 0.5 |
| 114 | Yellow Light | 80 | 80 | 80 | Yellow Boat Light | 0.6 | 1 1 0 | Omn | — | — | — | 0.22 | 0.5 |
| 115 | Marine Entry | 81 | 81 | 81 | Generic Marine Entry Light | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 116 | Green Light | 82 | 82 | 82 | Green Light | 0.6 | 0 1 0 | Omn | — | — | — | — | — |
| 117 | Red Light | 83 | 83 | 83 | Red Light | 0.6 | 1 0 0 | Omn | — | — | — | — | — |
| 118 | Ship Boat | 84 | 84 | 84 | Generic Ship/boat Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 119 | Navigation | 85 | 85 | 85 | Generic Navigation Lights on a Ship/Boat | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 120 | Directional | 86 | 86 | 86 | Generic Directional navigation Lights | 0.6 | 1 1 1 | Dir | 180 | 180 | — | — | — |
| 121 | Green Light | 87 | 87 | 87 | Green directional navigation Light | 0.6 | 0 1 0 | Dir | 180 | 180 | — | — | — |
| 122 | Red Light | 88 | 88 | 88 | Red directional navigation Light | 0.6 | 1 0 0 | Dir | 180 | 180 | — | — | — |
| 123 | White Light | 89 | 89 | 89 | White directional navigation Light | 0.6 | 1 1 1 | Dir | 180 | 180 | — | — | — |
| 124 | Omnidirectional | 90 | 90 | 90 | Generic Omnidirectional navigation Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 125 | Green Light | 91 | 91 | 91 | Green omnidirectional navigation Light | 0.6 | 0 1 0 | Omn | — | — | — | — | — |
| 126 | Red Light | 92 | 92 | 92 | Red omnidirectional navigation Light | 0.6 | 1 0 0 | Omn | — | — | — | — | — |
| 127 | White Light | 93 | 93 | 93 | White omnidirectional navigation Light | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 128 | Search Light | 94 | 94 | 94 | Search Light | 0.9 | 1 1 1 | Dir | 10 | 10 | — | — | — |
| 129 | NVG Light | 95 | 95 | 95 | Search Light used in NVG mode | 0.9 | 1 1 1 | Dir | 10 | 10 | — | — | — |
| 130 | Civil | 96 | 96 | 96 | Generic Ship/boat civil Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 131 | Anchor Light | 97 | 97 | 97 | Lights used to illuminate the anchor | 0.6 | 1 1 1 | Dir | 180 | 120 | — | — | — |
| 132 | Flood Light | 98 | 98 | 98 | Lights used to illuminate the ground on the deck | 0.6 | 1 1 1 | Dir | 30 | 30 | — | — | — |
| 133 | Mast | 99 | 99 | 99 | Generic Lights found on a mast of the civilian ship | 0.6 | 1 1 1 | Dir | 225 | 120 | — | — | — |
| 134 | Amber Light | 100 | 100 | 100 | Amber Mast Light | 0.6 | 1 0.6 0 | Dir | 225 | 120 | — | — | — |
| 135 | Green Light | 101 | 101 | 101 | Green Mast Light | 0.6 | 0 1 0 | Dir | 225 | 120 | — | — | — |
| 136 | Red Light | 102 | 102 | 102 | Red Mast Light | 0.6 | 1 0 0 | Dir | 225 | 120 | — | — | — |
| 137 | White Light | 103 | 103 | 103 | White Mast Light | 0.6 | 1 1 1 | Dir | 225 | 120 | — | — | — |
| 138 | Cargo | 104 | 104 | 104 | Generic Cargo Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 139 | Container_Vessel | 105 | 105 | 105 | Generic Container Vessel Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 140 | Ferry | 106 | 106 | 106 | Generic Ferry Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 141 | Fishing_Vessel | 107 | 107 | 107 | Generic Fishing Vessel Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 142 | Cruise_Line | 108 | 108 | 108 | Generic Cruise Liner specific Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 143 | Oil_Rig | 109 | 109 | 109 | Generic Oil Rig Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 144 | Tanker | 110 | 110 | 110 | generic Tanker Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 145 | Military | 111 | 111 | 111 | Generic Military Ship/Boat Lights | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 146 | Plane Light | 112 | 112 | 112 | Light effect from a Plane | 0.6 | 1 1 1 | Omn | — | — | — | — | — |
| 147 | Flood Light | 113 | 113 | 113 | Lights used to illuminate the ground on the deck | 0.6 | 1 1 1 | Dir | 30 | 30 | — | — | — |
| 148 | Mast | 114 | 114 | 114 | Generic Lights found on a mast of the military ship | 0.6 | 1 1 1 | Dir | 225 | 120 | — | — | — |
| 149 | Amber Light | 115 | 115 | 115 | Amber Mast Light | 0.6 | 1 0.6 0 | Dir | 225 | 120 | — | — | — |
| 150 | Green Light | 116 | 116 | 116 | Green Mast Light | 0.6 | 0 1 0 | Dir | 225 | 120 | — | — | — |

| Light Hierarchy | | | | Light Code | Description | Min alt normalized | Color normalized RGB | Directionality | Alt. hor (degrees) | Alt. vert (degrees) | Min alt. Res normalized | Frequency Hz | Duty Cycle normalized |
|-----------------|-------------------------|-----|-----|------------|---|-----------------------|----------------------------|----------------|-----------------------|------------------------|----------------------------|-----------------|--------------------------|
| 151 | Red Light | 117 | 117 | 117 | Red Mast Light | 0.6 | 1 0 0 | Dir | 225 | 120 | — | — | — |
| 152 | White Light | 118 | 118 | 118 | White Mast Light | 0.6 | 1 1 1 | Dir | 225 | 120 | — | — | — |
| 153 | Mast | 447 | 447 | 447 | Generic High Intensity Radiated Field Lights | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 154 | Amber Light | 448 | 448 | 448 | Amber Mast Light | 0.6 | 1 0.6 0 | Omni | — | — | — | — | — |
| 155 | Red Light | 449 | 449 | 449 | Red Mast Light | 0.6 | 1 0 0 | Omni | — | — | — | — | — |
| 156 | Horizon Bar | 119 | 119 | 119 | Generic Horizon Bar Lights for landing on ship | 0.6 | 0 1 0 | Omni | — | — | — | — | — |
| 157 | Green Light | 120 | 120 | 120 | Green horizon bar Light | 0.6 | 0 1 0 | Omni | — | — | — | — | — |
| 158 | White Light | 121 | 121 | 121 | White horizon bar Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 159 | Stem | 450 | 450 | 450 | Generic Stem Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 160 | Port Light | 451 | 451 | 451 | Port stem Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 161 | Starboard Light | 452 | 452 | 452 | Starboard stem Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 162 | Vertical Light | 453 | 453 | 453 | Vertical Replacement Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 163 | Aircraft Carrier | 122 | 122 | 122 | Generic aircraft carrier Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 164 | Approach Light | 123 | 123 | 123 | Aircraft Carrier approach Light | 0.6 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 165 | Approach Strobe Light | 124 | 124 | 124 | Aircraft Carrier approach strobe Light | 0.6 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 166 | Deck | 125 | 125 | 125 | Generic Deck Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 167 | Alt Light | 126 | 126 | 126 | Deck Alt area 1/4 mark | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 168 | Fore Light | 127 | 127 | 127 | Deck Fore area 2/4 mark | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 169 | Edge | 128 | 128 | 128 | Generic Edge Light found on a Deck | 0.6 | 0 0 1 | Omni | — | — | — | — | — |
| 170 | Blue Light | 129 | 129 | 129 | Blue Deck edge Light | 0.6 | 0 0 1 | Omni | — | — | — | — | — |
| 171 | Red Light | 454 | 454 | 454 | Red Deck edge Light | 0.6 | 1 0 0 | Omni | — | — | — | — | — |
| 172 | White Light | 130 | 130 | 130 | White Deck edge Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 173 | Obstruction Light | 131 | 131 | 131 | Deck Light indicating the presence of an object which is dangerous to an aircraft | 0.6 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 |
| 174 | Mark Area | 132 | 132 | 132 | Generic Mark Area found on a deck | 0.7 | 1 0.6 0 | Omni | — | — | — | — | — |
| 175 | Amber Light | 133 | 133 | 133 | Amber deck Light | 0.7 | 1 0.6 0 | Omni | — | — | — | — | — |
| 176 | Green Light | 134 | 134 | 134 | Green deck Light | 0.7 | 0 1 0 | Omni | — | — | — | — | — |
| 177 | Red Light | 135 | 135 | 135 | Red deck Light | 0.7 | 1 0 0 | Omni | — | — | — | — | — |
| 178 | Ready Light | 136 | 136 | 136 | Generic Deck Ready Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 179 | Status | 137 | 137 | 137 | Generic Status Light indicating the authority for flying operations to the Flight Deck Officer or Pilot | 0.6 | 1 0.6 0 | Omni | — | — | — | — | — |
| 180 | Amber Light | 138 | 138 | 138 | Amber status Light | 0.6 | 1 0.6 0 | Omni | — | — | — | — | — |
| 181 | Green Light | 139 | 139 | 139 | Green status Light (Go signal) | 0.6 | 0 1 0 | Omni | — | — | — | — | — |
| 182 | Red Light | 140 | 140 | 140 | Red status Light (Stop signal) | 0.6 | 1 0 0 | Omni | — | — | — | — | — |
| 183 | Flood Light | 141 | 141 | 141 | Lights used to illuminate the ground or the deck | 0.6 | 1 1 1 | Dir | 30 | 30 | — | — | — |
| 184 | GPS | 142 | 142 | 142 | Generic Glide path indicator Light | 0.7 | 1 0.6 0 | Dir | 150 | 54 | — | — | — |
| 185 | Flashing Green Light | 143 | 143 | 143 | Green Flashing GPI | 0.7 | 0 1 0 | Dir | 120 | 20 | — | 1.5 | 0.17 |
| 186 | Flashing Orange Light | 144 | 144 | 144 | Orange Flashing GPI | 0.7 | 1 0.6 0 | Dir | 150 | 54 | — | 3.5 | 0.055 |
| 187 | Amber Light | 145 | 145 | 145 | Amber GPI Light | 0.7 | 1 0.6 0 | Dir | 30 | 5 | — | — | — |
| 188 | Green Light | 146 | 146 | 146 | Green GPI Light | 0.7 | 0 1 0 | Dir | 30 | 2 | — | — | — |
| 189 | Red Light | 147 | 147 | 147 | Red GPI Light | 0.7 | 1 0 0 | Dir | 30 | 5 | — | — | — |
| 190 | HAIL | 148 | 148 | 148 | Generic Horizontal Approach Path Indicator Light | 0.6 | 1 1 1 | Dir | 50 | 15 | — | — | — |
| 191 | Red Light | 149 | 149 | 149 | Red HAIL Light | 0.6 | 1 0 0 | Dir | 50 | 15 | — | — | — |
| 192 | White Light | 150 | 150 | 150 | White HAIL Light | 0.6 | 1 1 1 | Dir | 50 | 15 | — | — | — |
| 193 | Homing Beacon Light | 151 | 151 | 151 | Used to identify the vessel to an approaching aircraft | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 194 | HPI Light | 152 | 152 | 152 | Horizontal Path Indicator | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 195 | No-Go Light | 153 | 153 | 153 | Abort go Light | 0.6 | 1 1 1 | Dir | 150 | 150 | — | — | — |
| 196 | Nozzle Retraction Light | 154 | 154 | 154 | Nozzle retraction Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 197 | Pre-Fly Light | 455 | 455 | 455 | Primary Flight control Light | 0.6 | 1 1 1 | Omni | — | — | — | — | — |
| 198 | SGSI | 155 | 155 | 155 | Generic Stabilized Glide Slope Indicator (Approach Light indicator) | 0.6 | 1 0.6 0 | Dir | 40 | 6.5 | — | — | — |
| 199 | Amber Light | 156 | 156 | 156 | Amber SGSI Light | 0.6 | 1 0.6 0 | Dir | 40 | 1.5 | — | — | — |
| 200 | Blue Light | 157 | 157 | 157 | Blue SGSI Light | 0.6 | 0 0 1 | Dir | 40 | 1 | — | — | — |

| Light Hierarchy | | | | VLS Light Code | VLS Light Code | Light Code | Description | min alt normalized | Color normalized RGB | Directionality type | Alt_Hor (degrees) | Alt_Vert (degrees) | min alt_Res normalized | Frequency Hz | Duty Cycle normalized |
|-----------------|-------------|--------------------------------|-------------------------|----------------|----------------|------------|--|--------------------|----------------------|---------------------|-------------------|--------------------|------------------------|--------------|-----------------------|
| 201 | Aircraft | General | Green Light | 155 | 155 | 155 | Green SGL Light | 0.5 | 0 1 0 | Dir | 40 | 1 | — | — | — |
| 202 | | | Red Light | 159 | 159 | 159 | Red SGL Light | 0.5 | 1 0 0 | Dir | 40 | 8.5 | — | — | — |
| 203 | | | Standby Light | 160 | 160 | 160 | A means of indicating an aircraft is at standby | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 204 | | | Steady Ship Light | 161 | 161 | 161 | Steady ship Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 205 | | | STOL | 162 | 162 | 162 | Generic Short Takeoff and landing Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 206 | | | Dropline Light | 163 | 163 | 163 | STOL Dropline Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 207 | | | Lineup Centerline Light | 164 | 164 | 164 | STOL Lineup Centerline Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 208 | | | Waveoff Light | 165 | 165 | 165 | A means of indicating to approaching aircraft that recovery is not permitted and should be aborted immediately. | 0.5 | 1 1 1 | Omni | — | — | — | 2 | 0.25 |
| 209 | | Ship | Cruiser | 166 | 166 | 166 | Generic Cruiser Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 210 | | | Destroyer | 167 | 167 | 167 | Generic Destroyer Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 211 | | | Frigate | 168 | 168 | 168 | Generic Frigate Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 212 | | | Patrol | 169 | 169 | 169 | Generic Patrol ship Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 213 | | | Battleship | 170 | 170 | 170 | Generic Battleship Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 214 | | | Cargo | 171 | 171 | 171 | Generic Cargo Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 215 | | Subsurface | | 172 | 172 | 172 | Generic Subsurface Vehicle Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 216 | | Submarine | | 173 | 173 | 173 | Generic Submarine Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 217 | Munition | Munition | | 174 | 174 | 174 | Generic Munition Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 218 | | Tracer Light | | 175 | 175 | 175 | Light created by tracer fire effect in a bullet | 0.5 | 1 0.5 0 | Omni | — | — | — | — | — |
| 219 | | Decoy Flame Light | | 176 | 176 | 176 | Decoy flare Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 220 | | Datraws Flame Light | | 177 | 177 | 177 | Datraws flare Light | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 221 | | Flareworks Datraws Flame Light | | 178 | 178 | 178 | Flareworks flare Light | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 222 | | Flare Light | | 179 | 179 | 179 | Flare defensive counter measure Light effect (vs. IR guided missile) | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 223 | | Chaff Light | | 180 | 180 | 180 | Chaff defensive counter measure Light effect (vs. Radar guided missile) | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 224 | | Lifeform | | 181 | 181 | 181 | Generic Lifeform Light (regroups all Lights that could be assigned to any human lifeform) | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 225 | | Flashlight Light | | 182 | 182 | 182 | Hand held flashlight | 0.5 | 1 1 1 | Dir | 45 | 45 | — | — | — |
| 226 | | Marshaler | | 183 | 183 | 183 | Generic Marshaler Lights | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 227 | Personnel | Ground_Personnel | | 184 | 184 | 184 | Generic Ground Personnel Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 228 | | Survivor | | 185 | 185 | 185 | Generic Survivor Lights (on ground or sea) | 0.7 | 1 1 1 | Omni | — | — | — | 1 | 0.25 |
| 229 | | Cultural | | 186 | 186 | 186 | Generic Cultural Ground base Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 230 | | Point-Based | | 187 | 187 | 187 | Generic Point based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 231 | Obstruction | Hazard Light | | 188 | 188 | 188 | Lights used to illuminate the ground | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 232 | | Obstruction | | 189 | 189 | 189 | Generic Obstruction Light - A Light indicating the presence of an object which is dangerous to aircraft in flight. | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 233 | | Red | | | | 514 | Generic Red Obstruction Light | 0.9 | 1 0 0 | Omni | — | — | — | 0.5 | 0.5 |
| 234 | | | Type L284 Light | | | 515 | A flashing red obstruction Light with 20-40 flashes per minute (FAA type L-284) | 0.9 | 1 0 0 | Omni | — | — | — | 0.5 | 0.5 |
| 235 | | | Type L385 Light | | | 516 | A flashing red obstruction Light with 60 flashes per minute (FAA type L-385) | 0.9 | 1 0 0 | Omni | — | — | — | 1 | 0.5 |
| 236 | | | Type L310 Light | | | 517 | A steady burning red obstruction Light (FAA type L-310) | 0.5 | 1 0 0 | Omni | — | — | — | — | — |
| 237 | | White | | | | 518 | Generic White Obstruction Light | 1.0 | 1 1 1 | Omni | — | — | — | 0.55 | 0.1 |
| 238 | | | Type L336 Light | | | 519 | A high intensity flashing white obstruction Light with 40 flashes per minute (FAA type L-336) | 1.0 | 1 1 1 | Omni | — | — | — | 0.55 | 0.1 |
| 239 | | | Type L337 Light | | | 520 | A high intensity flashing white obstruction Light with 60 flashes per minute (FAA type L-337) | 1.0 | 1 1 1 | Omni | — | — | — | 1 | 0.1 |
| 240 | | | Type L385 Light | | | 521 | A medium intensity flashing white obstruction Light with 40 flashes per minute (FAA type L-385) | 0.5 | 1 1 1 | Omni | — | — | — | 0.55 | 0.1 |
| 241 | | | Type L386 Light | | | 522 | A medium intensity flashing white obstruction Light with 60 flashes per minute (FAA type L-386) | 0.5 | 1 1 1 | Omni | — | — | — | 1.0 | 0.1 |
| 242 | | | Strobe Light | 190 | 190 | 190 | Flashing Ground Light that helps to indicate position | 0.5 | 1 1 1 | Omni | — | — | — | 1 | 0.05 |
| 243 | | | Communication_Tower | 191 | 191 | 191 | Generic Communication Tower Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 244 | | | FAIS* | 192 | 192 | 192 | Generic Forward Area Reaim/Refuel Point Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 245 | | | IR Light | 193 | 193 | 193 | Forward Area Reaim/Refuel Point IR Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 246 | | | Strobe Light | 194 | 194 | 194 | Forward Area Reaim/Refuel Point strobe Light | 0.9 | 1 1 1 | Omni | — | — | — | 1 | 0.05 |
| 247 | | | Y Light | 195 | 195 | 195 | Forward Area Reaim/Refuel Point Y shaped Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 248 | | Harbour Light | | 196 | 196 | 196 | Harbour Light | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 249 | | Pylon | | 197 | 197 | 197 | Generic Power Pylon Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 250 | | Railroad Junction | | 198 | 198 | 198 | Generic Railroad Junction Lights | 0.5 | 1 0 0 | Omni | — | — | — | 0.57 | 0.5 |

| Light Hierarchy | | v0.0 Light Code | v0.1 Light Code | Light Code | Description | min stc normalized | Color normalized RGB | Directionality type | Width_Hor (degrees) | Width_Vert (degrees) | min stc_Fea normalized | Frequency Hz | Duty Cycle normalized |
|-----------------|-----------------------|-----------------------|-----------------------|---------------|--|-----------------------|----------------------------|------------------------|------------------------|-------------------------|---------------------------|-----------------|--------------------------|
| 251 | Flashing Red Light | 199 | 199 | 199 | Flashing Red rail road crossing stop Light | 0.5 | 1 0 0 | Omni | — | — | — | 0.67 | 0.5 |
| 252 | Highway Junction | 200 | 200 | 200 | Generic Highway Junction Light | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 253 | Bridge | 201 | 201 | 201 | Generic Bridge Light | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 254 | Hazard | 202 | 202 | 202 | Generic Hazard Light - A White Light indicating the presence of an hazard around the airport | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 255 | Flashing Light | 203 | 203 | 203 | White hazard flashing Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 256 | Ht Intensity Light | 204 | 204 | 204 | White Ht Intensity hazard Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 257 | Line-Based | 205 | 205 | 205 | Generic Line-based Light (Linear features ex: Roads) | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 258 | Fluorescent Light | 206 | 206 | 206 | Fluorescent based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 259 | Incandescent Light | 207 | 207 | 207 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 260 | Mercury Light | 208 | 208 | 208 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 261 | Metal Halide Light | 209 | 209 | 209 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 262 | Sodium Light | 210 | 210 | 210 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 263 | Multilane Divided Hwy | 211 | 211 | 211 | Generic Multi-lane divided highway Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 264 | Incandescent Light | 212 | 212 | 212 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 265 | Mercury Light | 213 | 213 | 213 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 266 | Metal Halide Light | 214 | 214 | 214 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 267 | Sodium Light | 215 | 215 | 215 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 268 | Median | 216 | 216 | 216 | Median divider Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 269 | Edge | 217 | 217 | 217 | Highway edge/sidewalk Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 270 | Multilane Hwy | 218 | 218 | 218 | Generic Multi-lane highway Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 271 | Incandescent Light | 219 | 219 | 219 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 272 | Mercury Light | 220 | 220 | 220 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 273 | Metal Halide Light | 221 | 221 | 221 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 274 | Sodium Light | 222 | 222 | 222 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 275 | Median | 223 | 223 | 223 | Median divider Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 276 | Edge | 224 | 224 | 224 | Highway edge/sidewalk Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 277 | Highway | 225 | 225 | 225 | Generic Single Lane Highway | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 278 | Incandescent Light | 226 | 226 | 226 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 279 | Mercury Light | 227 | 227 | 227 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 280 | Metal Halide Light | 228 | 228 | 228 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 281 | Sodium Light | 229 | 229 | 229 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 282 | Road | 230 | 230 | 230 | Generic Road Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 283 | Incandescent Light | 231 | 231 | 231 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 284 | Mercury Light | 232 | 232 | 232 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 285 | Metal Halide Light | 233 | 233 | 233 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 286 | Sodium Light | 234 | 234 | 234 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 287 | Boulevard | 235 | 235 | 235 | Generic Boulevard Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 288 | Incandescent Light | 236 | 236 | 236 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 289 | Mercury Light | 237 | 237 | 237 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 290 | Metal Halide Light | 238 | 238 | 238 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 291 | Sodium Light | 239 | 239 | 239 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 292 | Street | 240 | 240 | 240 | Generic Small street Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 293 | Incandescent Light | 241 | 241 | 241 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 294 | Mercury Light | 242 | 242 | 242 | Mercury based Light | 0.5 | 0.5 0.5 1 | Omni | — | — | — | — | — |
| 295 | Metal Halide Light | 243 | 243 | 243 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 296 | Sodium Light | 244 | 244 | 244 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 297 | Lane | 245 | 245 | 245 | Generic line based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 298 | Incandescent Light | 246 | 246 | 246 | Incandescent based Light | 0.5 | 1 0.5 0.5 | Omni | — | — | — | — | — |
| 299 | Area-Based | 247 | 247 | 247 | Generic Area Light: which cover a larger area | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 300 | Fluorescent Light | 248 | 248 | 248 | Fluorescent based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |

| | Light Hierarchy | v0.0 Light Code | v0.1 Light Code | Light Code | Description | min_stc normalized | Color normalized RGB | Directionality type | Width_for (degrees) | Width_vert (degrees) | min_stc_Fea normalized | Frequency Hz | Duty_Cycle normalized |
|-----|-----------------------------------|-----------------------|-----------------------|---------------|---|-----------------------|----------------------------|------------------------|------------------------|-------------------------|---------------------------|-----------------|--------------------------|
| 201 | Incandescent Light | 249 | 249 | 249 | Incandescent based Light | 0.5 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 202 | Mercury Light | 250 | 250 | 250 | Mercury based Light | 0.5 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 203 | Metal Halide Light | 251 | 251 | 251 | Metal Halide based Light | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 204 | Sodium Light | 252 | 252 | 252 | Sodium based Light | 0.5 | 1 1 0 | Omni | — | — | — | — | — |
| 205 | Residential Area | 253 | 253 | 253 | Generic Residential Area based Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 206 | Bright | 254 | 254 | 254 | Generic Bright residential area Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 207 | Incandescent Light | 255 | 255 | 255 | Incandescent bright Light | 0.5 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 208 | Mercury Light | 256 | 256 | 256 | Mercury bright Light | 0.5 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 209 | Dim | 257 | 257 | 257 | Generic Dim residential area Lights | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 210 | Incandescent Light | 258 | 258 | 258 | Incandescent dim Light | 0.7 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 211 | Mercury Light | 259 | 259 | 259 | Mercury dim Light | 0.7 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 212 | Industrial Area | 260 | 260 | 260 | Generic Industrial Area based Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 213 | Bright | 261 | 261 | 261 | Generic Bright industrial area Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 214 | Incandescent Light | 262 | 262 | 262 | Incandescent bright Light | 0.5 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 215 | Mercury Light | 263 | 263 | 263 | Mercury bright Light | 0.5 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 216 | Dim | 264 | 264 | 264 | Generic dim industrial area Lights | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 217 | Incandescent Light | 265 | 265 | 265 | Incandescent dim Light | 0.7 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 218 | Mercury Light | 266 | 266 | 266 | Mercury dim Light | 0.7 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 219 | Downtown Area | 267 | 267 | 267 | Generic City Downtown Area Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 220 | Bright | 268 | 268 | 268 | Generic bright downtown area Lights | 0.5 | 1 1 1 | Omni | — | — | — | — | — |
| 221 | Incandescent Light | 269 | 269 | 269 | Incandescent bright Light | 0.5 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 222 | Mercury Light | 270 | 270 | 270 | Mercury bright Light | 0.5 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 223 | Dim | 271 | 271 | 271 | Generic dim downtown area Lights | 0.7 | 1 1 1 | Omni | — | — | — | — | — |
| 224 | Incandescent Light | 272 | 272 | 272 | Incandescent dim Light | 0.7 | 1 0.6 0.3 | Omni | — | — | — | — | — |
| 225 | Mercury Light | 273 | 273 | 273 | Mercury dim Light | 0.7 | 0.9 0.9 1 | Omni | — | — | — | — | — |
| 226 | Airport Lighting | 274 | 274 | 274 | Generic Airport Lighting | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 227 | Apron | 275 | 275 | 275 | Generic Apron Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 228 | Entrance Light | 276 | 276 | 276 | Apron entrance Light from runway or taxiway | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 229 | Flood Light | 277 | 277 | 277 | Flood Light to illuminate the Apron | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 230 | Beacon | 278 | 278 | 278 | Generic Beacon Light | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |
| 231 | 10 Beacon Light | 279 | 279 | 279 | Identification Beacon Light | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |
| 232 | UK Pundit Light-JXL | | | 323 | Red UK Pundit Light where 000 denotes two-letter Pundit code. NOTE: Red Omni flashing pattern is equivalent to the two-letter mode code for 000 | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 233 | Double White Rotating 2sec Light | 427 | 427 | 427 | Double peak White 2sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.5 | 0.33 |
| 234 | Double White Rotating 3sec Light | 428 | 428 | 428 | Double peak White 3sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |
| 235 | Double White Rotating 5sec Light | 429 | 429 | 429 | Double peak White 5sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.2 | 0.33 |
| 236 | Double White Rotating 10sec Light | 430 | 430 | 430 | Double peak White 10sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.1 | 0.33 |
| 237 | White Rotating 2sec Light | 280 | 280 | 280 | White 2 sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.5 | 0.33 |
| 238 | White Rotating 3sec Light | 281 | 281 | 281 | White 3 sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |
| 239 | White Rotating 5sec Light | 282 | 282 | 282 | White 5 sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.2 | 0.33 |
| 240 | White Rotating 10sec Light | 443 | 443 | 443 | White 10sec Internal Rotating Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.1 | 0.33 |
| 241 | Green Rotating 2sec Light | 283 | 283 | 283 | Green 2 sec Internal Rotating Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.5 | 0.33 |
| 242 | Green Rotating 3sec Light | 284 | 284 | 284 | Green 3 sec Internal Rotating Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.33 | 0.33 |
| 243 | Green Rotating 5sec Light | 285 | 285 | 285 | Green 5 sec Internal Rotating Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.2 | 0.33 |
| 244 | Green Rotating 10sec Light | 440 | 440 | 440 | Green 10 sec Internal Rotating Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.1 | 0.33 |
| 245 | Yellow Rotating 2sec Light | 430 | 430 | 430 | Yellow 2 sec Internal Rotating Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.5 | 0.33 |
| 246 | Yellow Rotating 3sec Light | 431 | 431 | 431 | Yellow 3 sec Internal Rotating Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.33 | 0.33 |
| 247 | Yellow Rotating 5sec Light | 432 | 432 | 432 | Yellow 5 sec Internal Rotating Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.2 | 0.33 |
| 248 | Yellow Rotating 10sec Light | 441 | 441 | 441 | Yellow 10 sec Internal Rotating Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.1 | 0.33 |
| 249 | Double White Flashing 2sec Light | 433 | 433 | 433 | Double peak White 2sec Internal Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.5 | 0.33 |
| 250 | Double White Flashing 3sec Light | 434 | 434 | 434 | Double peak White 3sec Internal Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |

| | Light Hierarchy | v4.0 Light Code | v4.1 Light Code | Light Code | Description | min_atc_ normalised | color_ normalised rgb | directionality_ type | min_h_ for_ (degrees) | min_v_ vert_ (degrees) | min_atc_res_ normalised | Frequency_ Hz | Duty_Cycle_ normalised |
|-----|-----------------------------------|-----------------------|-----------------------|---------------|--|------------------------|-----------------------------|-------------------------|-----------------------------|------------------------------|----------------------------|------------------|---------------------------|
| 281 | Double White Flashing 5sec Light | 425 | 425 | 425 | Double peak White 5 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.2 | 0.33 |
| 282 | Double White Flashing 10sec Light | 442 | 442 | 442 | Double peak White 10 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.1 | 0.33 |
| 283 | White Flashing 5sec Light | 255 | 255 | 255 | White 2 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.5 | 0.33 |
| 284 | White Flashing 5sec Light | 257 | 257 | 257 | White 2 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.33 | 0.33 |
| 285 | White Flashing 5sec Light | 255 | 255 | 255 | White 5 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.2 | 0.33 |
| 286 | White Flashing 10sec Light | 445 | 445 | 445 | White 10 sec Interval Flashing Beacon | 0.9 | 1 1 1 | Omni | — | — | — | 0.1 | 0.33 |
| 287 | Green Flashing 5sec Light | 259 | 259 | 259 | Green 2 sec Interval Flashing Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.5 | 0.33 |
| 288 | Green Flashing 5sec Light | 290 | 290 | 290 | Green 2 sec Interval Flashing Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.33 | 0.33 |
| 289 | Green Flashing 5sec Light | 291 | 291 | 291 | Green 5 sec Interval Flashing Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.2 | 0.33 |
| 290 | Green Flashing 10sec Light | 443 | 443 | 443 | Green 10 sec Interval Flashing Beacon | 0.9 | 0 1 0 | Omni | — | — | — | 0.1 | 0.33 |
| 291 | Yellow Flashing 5sec Light | 426 | 426 | 426 | Yellow 2 sec Interval Flashing Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.5 | 0.33 |
| 292 | Yellow Flashing 5sec Light | 427 | 427 | 427 | Yellow 2 sec Interval Flashing Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.33 | 0.33 |
| 293 | Yellow Flashing 5sec Light | 425 | 425 | 425 | Yellow 5 sec Interval Flashing Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.2 | 0.33 |
| 294 | Yellow Flashing 10sec Light | 444 | 444 | 444 | Yellow 10 sec Interval Flashing Beacon | 0.9 | 1 1 0 | Omni | — | — | — | 0.1 | 0.33 |
| 295 | Obstruction System | 292 | 292 | 292 | Generic Obstruction System Light | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 296 | Amber Light | 292 | 292 | 292 | Amber Obstruction System Light | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 297 | Green Light | 294 | 294 | 294 | Green Obstruction System Light | 0.9 | 0 1 0 | Omni | — | — | — | — | — |
| 298 | Red Light | 295 | 295 | 295 | Red Obstruction System Light | 0.9 | 1 0 0 | Omni | — | — | — | — | — |
| 299 | Obstruction | 295 | 295 | 295 | Generic Obstruction Light - A red light indicating the presence of an object which is dangerous to an aircraft in flight. | 0.55 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 |
| 300 | Flashing Light | 297 | 297 | | Red Obstruction flashing light (deprecated in CDB v3.2) | 0.55 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 |
| 301 | Hi Intensity Light | 295 | 295 | | Red Hi-Intensity obstruction light (deprecated in CDB v3.2) | 0.9 | 1 0 0 | Omni | — | — | — | 0.5 | 0.33 |
| 302 | Runway | 299 | 299 | 299 | Generic Runway Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 303 | Approach System | 300 | 300 | 300 | Generic Airport Approach Lighting Systems | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 304 | Barrette | 301 | 301 | 301 | Generic Barrette Light | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 305 | Red Light | 302 | 302 | 302 | Red barrette light | 0.9 | 1 0 0 | Dir | 75 | 75 | — | — | — |
| 306 | White Light | 302 | 302 | 302 | White barrette light | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 307 | Green Light | 455 | 455 | 455 | Green barrette light | 0.9 | 0 1 0 | Dir | 75 | 75 | — | — | — |
| 308 | Circling Guidance Light | 304 | 304 | 304 | Circling Guidance Light which helps on a circling approach | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 309 | Landing Marking Light | 305 | 305 | 305 | Flashing Lights that illuminate any markings that need to be visible on the runway in low visibility | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 310 | Lead-in Light | 306 | 306 | 306 | LDIN - lead-in light system lights | 0.9 | 1 1 1 | Dir | 50 | 110 | — | — | — |
| 311 | Optical Landing System | 307 | 307 | 307 | Optical landing system lights | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 312 | High Intensity Light | 308 | 308 | 308 | High intensity approach light | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 313 | Low Intensity Light | 309 | 309 | 309 | Low intensity approach light | 0.55 | 1 1 1 | Dir | 75 | 75 | — | — | — |
| 314 | ODAL Light | 310 | 310 | 310 | Omni directional approach light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 315 | PAPI | 311 | 311 | 311 | Generic Precision approach path indicator. Provides visual glide slope indication using a single row of two or four light units. | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 316 | PAPI's Close Light | 312 | 312 | 312 | Abbreviated Precision Approach Path indicator's closest to runway | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 317 | PAPI's Far Light | 312 | 312 | 312 | Abbreviated Precision Approach Path indicator's farthest to runway | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 318 | Type A Light | 314 | 314 | 314 | PAPI A (farthest from runway) | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 319 | Type B Light | 315 | 315 | 315 | PAPI B (2nd from runway) | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 320 | Type C Light | 316 | 316 | 316 | PAPI C (3rd from runway) | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 321 | Type D Light | 317 | 317 | 317 | PAPI D (Closest from runway) | 0.55 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 322 | RAIL Light | 318 | 318 | 318 | Runway alignment indicator lights | 0.9 | 1 1 1 | Dir | 75 | 75 | — | — | 0.33 |
| 323 | RDCL Light | 319 | 319 | 319 | Runway End Identifier Lights | 0.55 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 324 | SQL | 320 | 320 | 320 | Generic Sequence Flashing Lights | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 325 | CAT | 321 | 321 | 321 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 326 | CAT | 322 | 322 | 322 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 327 | CALVERT | 323 | 323 | 323 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 328 | CALVERT | 324 | 324 | 324 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 329 | ALSA-1 | 325 | 325 | 325 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |
| 330 | ALSA-2 | 326 | 326 | 326 | Approach Lighting System with sequence flashing | 0.9 | 1 1 1 | Dir | 75 | 75 | — | 2 | 0.1 |

| Light Hierarchy | | | | Light Code | Description | min_stc normalized | Color normalized RGB | Directionality type | Wt_h_for degrees | Wt_v_for degrees | min_stc_res normalized | Frequency Hz | Dut_Cycle normalized |
|-----------------|-------------------|-----|-----|------------|---|--------------------|----------------------|---------------------|------------------|------------------|------------------------|--------------|----------------------|
| 401 | SSALF | 227 | 227 | 227 | Approach Lighting System with sequenced flashing | 0.9 | 11111 | Dr | 75 | 75 | — | 2 | 0.1 |
| 402 | SSALR | 228 | 228 | 228 | Approach Lighting System with sequenced flashing | 0.9 | 11111 | Dr | 75 | 75 | — | 2 | 0.1 |
| 403 | MALSF | 229 | 229 | 229 | Approach Lighting System with sequenced flashing | 0.9 | 11111 | Dr | 75 | 75 | — | 2 | 0.1 |
| 404 | MALSR | 230 | 230 | 230 | Approach Lighting System with sequenced flashing | 0.9 | 11111 | Dr | 75 | 75 | — | 2 | — |
| 405 | VASI | 231 | 231 | 231 | Generic Visual Approach Slope Indicator System (VASI) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 406 | 2-Bar | 232 | 232 | 232 | Generic 2-Bar Component VASI | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 407 | First Light | 233 | 233 | 233 | 2-Bar VASI (1st bar closest to threshold) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 408 | Second Light | 234 | 234 | 234 | 2-Bar VASI (2nd bar farthest from threshold) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 409 | 3-Bar | 235 | 235 | 235 | Generic 3-Bar component VASI | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 410 | First Light | 236 | 236 | 236 | 3-Bar VASI (1st bar closest to threshold) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 411 | Second Light | 237 | 237 | 237 | 3-Bar VASI (2nd bar in between 1st and 3rd) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 412 | Third Light | 238 | 238 | 238 | 3-Bar VASI (3rd bar farthest from threshold) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 413 | LCVASI Light | 239 | 239 | 239 | Low-cost VASI Light | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 414 | Flashed Light | 240 | 240 | 240 | PVASI (pulsating Light) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 415 | Typical | 241 | 241 | 241 | Generic T Shaped VASI (TVASI) | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 416 | Flashed Light | 242 | 242 | 242 | Ry Down Light | 0.9 | 11111 | Dr | 75 | 7 | — | — | — |
| 417 | Wing Bar Light | 243 | 243 | 243 | TVASS wing bar Light | 0.9 | 11111 | Dr | 75 | 10 | — | — | — |
| 418 | 2.50 Degree | 244 | 244 | 244 | Generic 2.50 degree TVAS | 0.9 | 11111 | Dr | 75 | 2.5 | — | — | — |
| 419 | Fly-Up1 Light | 245 | 245 | 245 | TVASS Fly-up 1 (closest to Wing Bar) for 2.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.5 | — | — | — |
| 420 | Fly-Up2 Light | 246 | 246 | 246 | TVASS Fly-up 2 (closest to Wing Bar) for 2.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.4166 | — | — | — |
| 421 | Fly-Up3 Light | 247 | 247 | 247 | TVASS Fly-up 3 (farthest to Wing Bar) for 2.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.3334 | — | — | — |
| 422 | 2.75 Degree | 248 | 248 | 248 | Generic 2.75 degree TVAS | 0.9 | 11111 | Dr | 75 | 2.75 | — | — | — |
| 423 | Fly-Up1 Light | 249 | 249 | 249 | TVASS Fly-up 1 (closest to Wing Bar) for 2.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.75 | — | — | — |
| 424 | Fly-Up2 Light | 250 | 250 | 250 | TVASS Fly-up 2 (closest to Wing Bar) for 2.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.6666 | — | — | — |
| 425 | Fly-Up3 Light | 251 | 251 | 251 | TVASS Fly-up 3 (farthest to Wing Bar) for 2.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.5834 | — | — | — |
| 426 | 3.00 Degree | 252 | 252 | 252 | Generic 3.00 degree TVAS | 0.9 | 11111 | Dr | 75 | 3 | — | — | — |
| 427 | Fly-Up1 Light | 253 | 253 | 253 | TVASS Fly-up 1 (closest to Wing Bar) for 3.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3 | — | — | — |
| 428 | Fly-Up2 Light | 254 | 254 | 254 | TVASS Fly-up 2 (closest to Wing Bar) for 3.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.9166 | — | — | — |
| 429 | Fly-Up3 Light | 255 | 255 | 255 | TVASS Fly-up 3 (farthest to Wing Bar) for 3.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 2.8334 | — | — | — |
| 430 | 3.25 Degree | 256 | 256 | 256 | Generic 3.25 degree TVAS | 0.9 | 11111 | Dr | 75 | 3.25 | — | — | — |
| 431 | Fly-Up1 Light | 257 | 257 | 257 | TVASS Fly-up 1 (closest to Wing Bar) for 3.25 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.25 | — | — | — |
| 432 | Fly-Up2 Light | 258 | 258 | 258 | TVASS Fly-up 2 (closest to Wing Bar) for 3.25 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.1666 | — | — | — |
| 433 | Fly-Up3 Light | 259 | 259 | 259 | TVASS Fly-up 3 (farthest to Wing Bar) for 3.25 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.0834 | — | — | — |
| 434 | 3.50 Degree | 260 | 260 | 260 | Generic 3.50 degree TVAS | 0.9 | 11111 | Dr | 75 | 3.5 | — | — | — |
| 435 | Fly-Up1 Light | 261 | 261 | 261 | TVASS Fly-up 1 (closest to Wing Bar) for 3.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.5 | — | — | — |
| 436 | Fly-Up2 Light | 262 | 262 | 262 | TVASS Fly-up 2 (closest to Wing Bar) for 3.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.4166 | — | — | — |
| 437 | Fly-Up3 Light | 263 | 263 | 263 | TVASS Fly-up 3 (farthest to Wing Bar) for 3.50 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.3334 | — | — | — |
| 438 | 3.75 Degree | 264 | 264 | 264 | Generic 3.75 degree TVAS | 0.9 | 11111 | Dr | 75 | 3.75 | — | — | — |
| 439 | Fly-Up1 Light | 265 | 265 | 265 | TVASS Fly-up 1 (closest to Wing Bar) for 3.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.75 | — | — | — |
| 440 | Fly-Up2 Light | 266 | 266 | 266 | TVASS Fly-up 2 (closest to Wing Bar) for 3.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.6666 | — | — | — |
| 441 | Fly-Up3 Light | 267 | 267 | 267 | TVASS Fly-up 3 (farthest to Wing Bar) for 3.75 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.5834 | — | — | — |
| 442 | 4.00 Degree | 268 | 268 | 268 | Generic 4.00 degree TVAS | 0.9 | 11111 | Dr | 75 | 4 | — | — | — |
| 443 | Fly-Up1 Light | 269 | 269 | 269 | TVASS Fly-up 1 (closest to Wing Bar) for 4.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 4 | — | — | — |
| 444 | Fly-Up2 Light | 270 | 270 | 270 | TVASS Fly-up 2 (closest to Wing Bar) for 4.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.9166 | — | — | — |
| 445 | Fly-Up3 Light | 271 | 271 | 271 | TVASS Fly-up 3 (farthest to Wing Bar) for 4.00 degree Glide slope | 0.9 | 11111 | Dr | 75 | 3.8334 | — | — | — |
| 446 | Centerline | 272 | 272 | 272 | Generic runway centerline Light | 0.9 | 11111 | 2-Dr | 75 | 75 | — | — | — |
| 447 | Red Light | 273 | 273 | 273 | Unidirectional Red runway centerline Light | 0.9 | 11010 | Dr | 75 | 75 | — | — | — |
| 448 | White Light | 274 | 274 | 274 | Unidirectional White runway centerline Light | 0.9 | 11111 | Dr | 75 | 75 | — | — | — |
| 449 | White White Light | 275 | 275 | 275 | Bidirectional White runway centerline Light | 0.9 | 11111 | 2-Dr | 75 | 75 | — | — | — |
| 450 | White Red Light | 276 | 276 | 276 | Bidirectional White/Red runway centerline Light | 0.9 | 11111 | 2-Dr | 75 | 75 | — | — | — |

| | Light Hierarchy | V0.0 Light Code | V0.1 Light Code | Light Code | Description | Min alt. (normalized) | Color (normalized RGB) | Directionality (type) | Min H. (degrees) | Max H. (degrees) | Min V. (degrees) | Min alt. (ft) (normalized) | Frequency (Hz) | Duty Cycle (normalized) |
|-----|------------------------|-----------------|-----------------|------------|---|-----------------------|------------------------|-----------------------|------------------|------------------|------------------|----------------------------|----------------|-------------------------|
| 451 | Red Red Light | | 311 | 311 | Bidirectional Red runway centerline Light | 0.9 | 1 0 0 | Bi-Dir | 75 | 75 | — | — | — | — |
| 452 | Edge | 317 | 317 | 317 | Generic Runway Edge Lights | 0.9 | 1 1 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 453 | White Light | 318 | 318 | 318 | Unidirectional White Edge Light | 0.9 | 1 1 1 | Dir | 150 | 150 | — | — | — | — |
| 454 | Amber Light | 319 | 319 | 319 | Unidirectional Amber Edge Light | 0.9 | 1 0 0 | Dir | 150 | 150 | — | — | — | — |
| 455 | Red Light | 320 | 320 | 320 | Unidirectional Red Edge Light | 0.9 | 1 0 0 | Dir | 150 | 150 | — | — | — | — |
| 456 | Blue Light | 321 | 321 | 321 | Unidirectional Blue Edge Light | 0.9 | 0 0 1 | Dir | 150 | 150 | — | — | — | — |
| 457 | White White Light | 322 | 322 | 322 | Bidirectional White Edge Light | 0.9 | 1 1 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 458 | White Amber Light | 323 | 323 | 323 | White-Amber Edge Light | 0.9 | 1 1 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 459 | White Red Light | 324 | 324 | 324 | White-Red Edge Light | 0.9 | 1 1 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 460 | White Blue Light | 325 | 325 | 325 | White-Blue Edge Light | 0.9 | 1 1 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 461 | Amber Amber Light | 326 | 326 | 326 | Bidirectional Amber Edge Light | 0.9 | 1 0 0 | Bi-Dir | 150 | 150 | — | — | — | — |
| 462 | Amber Red Light | 327 | 327 | 327 | Amber-Red Edge Light | 0.9 | 1 0 0 | Bi-Dir | 150 | 150 | — | — | — | — |
| 463 | Amber Blue Light | 328 | 328 | 328 | Amber-Blue Edge Light | 0.9 | 1 0 0 | Bi-Dir | 150 | 150 | — | — | — | — |
| 464 | Blue Red Light | 329 | 329 | 329 | Blue-Red Edge Light | 0.9 | 0 0 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 465 | Red Red Light | 330 | 330 | 330 | Bidirectional Red Edge Light | 0.9 | 1 0 0 | Bi-Dir | 150 | 150 | — | — | — | — |
| 466 | Blue Blue Light | 331 | 331 | 331 | Bidirectional Blue Edge Light | 0.9 | 0 0 1 | Bi-Dir | 150 | 150 | — | — | — | — |
| 467 | End Wing Light | 332 | 332 | 332 | Runway End Wing Lights | 0.9 | 1 0 0 | Dir | 150 | 150 | — | — | — | — |
| 468 | End Light | 333 | 333 | 333 | Runway End Lights | 0.9 | 1 0 0 | Dir | 150 | 150 | — | — | — | — |
| 469 | Flood Light | 334 | 334 | 334 | Runway flood Lights | 0.9 | 1 1 1 | Omni | — | — | — | — | — | — |
| 470 | Overrun | 335 | 335 | 335 | Generic Overrun Light - A Light which indicated runway overruns | 0.9 | 1 0 0 | Dir | 150 | 90 | — | — | — | — |
| 471 | Amber Light | 336 | 336 | 336 | Amber overrun Light | 0.9 | 1 0 0 | Dir | 150 | 90 | — | — | — | — |
| 472 | Blue Light | 337 | 337 | 337 | Blue overrun Light | 0.9 | 0 0 1 | Dir | 150 | 90 | — | — | — | — |
| 473 | Red Light | 338 | 338 | 338 | Red overrun Light | 0.9 | 1 0 0 | Dir | 150 | 90 | — | — | — | — |
| 474 | Threshold Wing Light | 339 | 339 | 339 | Threshold wing Lights | 0.9 | 0 1 0 | Dir | 150 | 150 | — | — | — | — |
| 475 | Threshold Light | 400 | 400 | 400 | Runway threshold Lights used to identify the landing threshold of the runway | 0.9 | 0 1 0 | Dir | 150 | 150 | — | — | — | — |
| 476 | Touchdown Zone Light | 401 | 401 | 401 | Touchdown Zone Lights used to identify the appropriate landing area on the runway after the threshold | 0.9 | 1 1 1 | Dir | 150 | 150 | — | — | — | — |
| 477 | LAMSO Light | 402 | 402 | 402 | Land and hold Short Operations Light: runway intersecting stop Lights | 0.9 | 1 0 0 | Omni | — | — | — | — | — | — |
| 478 | Taxiway | 403 | 403 | 403 | Generic Airport Taxiway Lights | 0.9 | 0 0 1 | Omni | — | — | — | — | — | — |
| 479 | Apron Entrance Light | 404 | 404 | 404 | Apron Entrance Light which indication area where taxi enters apron area | 0.9 | 0 0 1 | Omni | — | — | — | — | — | — |
| 480 | CAI III Hold Bar Light | 405 | 405 | 405 | Category III hold bar Light | 0.9 | 0 1 0 | Dir | 150 | 150 | — | — | — | — |
| 481 | Centerline | 406 | 406 | 406 | Generic Centerline Taxiway Lights | 0.9 | 0 1 0 | Dir | 90 | 110 | — | — | — | — |
| 482 | Aligned Light | 407 | 407 | 407 | Aligned Light for a straight sequence of a taxiway | 0.9 | 0 1 0 | Dir | 90 | 110 | — | — | — | — |
| 483 | Curved Light | 408 | 408 | 408 | Curved Lights for a curved sequence of a taxiway | 0.9 | 0 1 0 | Dir | 90 | 110 | — | — | — | — |
| 484 | Edge | 409 | 409 | 409 | Generic Taxiway edge Lights | 0.9 | 0 0 1 | Omni | — | — | — | — | — | — |
| 485 | Blue Light | 423 | 423 | 423 | Blue Taxi edge Light | 0.9 | 0 0 1 | Omni | — | — | — | — | — | — |
| 486 | White Light | 424 | 424 | 424 | White Taxi edge Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — | — |
| 487 | High-speed | 410 | 410 | 410 | Generic Taxiway high speed area Lights | 0.9 | 1 0 0 | Dir | 90 | 110 | — | — | — | — |
| 488 | Amber Light | 411 | 411 | 411 | Amber high speed Lights | 0.9 | 1 0 0 | Dir | 90 | 110 | — | — | — | — |
| 489 | Green Light | 412 | 412 | 412 | Green high-speed Lights | 0.9 | 0 1 0 | Dir | 90 | 110 | — | — | — | — |
| 490 | Lead-on | 413 | 413 | 413 | Generic Lead-On Light | 0.9 | 0 1 0 | Omni | — | — | — | — | — | — |
| 491 | Green Light | 459 | 459 | 459 | Green Lead-On Light | 0.9 | 0 1 0 | Omni | — | — | — | — | — | — |
| 492 | Yellow Light | 490 | 490 | 490 | Yellow Lead-On Light | 0.9 | 1 1 0 | Omni | — | — | — | — | — | — |
| 493 | Lead-off | 491 | 491 | 491 | Generic Lead-Off Light | 0.9 | 0 1 0 | Omni | — | — | — | — | — | — |
| 494 | Green Light | 492 | 492 | 492 | Green Lead-Off Light | 0.9 | 0 1 0 | Omni | — | — | — | — | — | — |
| 495 | Yellow Light | 493 | 493 | 493 | Yellow Lead-Off Light | 0.9 | 1 1 0 | Omni | — | — | — | — | — | — |
| 496 | No-entry Light | 414 | 414 | 414 | No entry zone Lights | 0.9 | 1 0 0 | Omni | — | — | — | — | — | — |
| 497 | Runway Guard | 415 | 415 | 415 | Runway guard Lights | 0.9 | 1 1 1 | Omni | — | — | — | — | — | — |
| 498 | Stop Bar Light | 416 | 416 | 416 | Stop Bar Lights | 0.9 | 1 0 0 | Dir | 150 | 150 | — | — | — | — |
| 499 | Clearance | 417 | 417 | 417 | Generic Clearance bar Light. They are located at 'hold short' positions on taxiways in order to increase the visibility of Unidirectional Taxiway Clearance Light (used when the hold is intended for one direction only) | 0.9 | 1 1 0 | Dir | 7 | 7 | — | — | — | — |
| 500 | Unidirectional Light | | | 512 | | 0.9 | 0 1 0 | Dir | 7 | 7 | — | — | — | — |

| | Light Hierarchy | v0.0 Light Code | v0.1 Light Code | Light Code | Description | min_stc normalized | Color normalized RGB | Directionality type | Altitude_Hor (degrees) | Altitude_Vert (degrees) | min_stc_Freq normalized | Frequency Hz | Duty_Cycle normalized |
|-----|----------------------|-----------------------|-----------------------|---------------|--|-----------------------|----------------------------|------------------------|---------------------------|----------------------------|----------------------------|-----------------|--------------------------|
| 501 | Bidirectional Light | | | 513 | Bidirectional Taxiway Clearance Light (used when the hold is intended for two-directional) | 0.9 | 1 1 0 | Dir | ? | ? | — | — | — |
| 502 | Guard | 418 | 418 | 418 | Generic RGL (Runway Guard Light) is used to enhance the visibility of taxiway holding positions on an airport. | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 503 | Type1 Light | 419 | | | (deprecated in CDB (0.1)) | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 504 | Type2 Light | 420 | | | (deprecated in CDB (0.1)) | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 505 | Type3 Light | 421 | | | (deprecated in CDB (0.1)) | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 506 | Type4 Light | 422 | | | (deprecated in CDB (0.1)) | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 507 | Wind Indicator Light | 423 | 423 | 423 | Wind Indicator Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 508 | Windsock Light | 424 | 424 | 424 | Windsock Light used to illuminate the windsock in poor visibility | 0.9 | 1 1 1 | Omni | — | — | — | — | — |
| 509 | Heliport | 457 | 457 | 457 | Generic Heliport Lights | 0.9 | 0 0 1 | Omni | — | — | — | — | — |
| 510 | Approach System | 458 | 458 | 458 | Generic Heliport Approach System Lights | 0.9 | 0 1 0 | Dir | 90 | 110 | — | — | — |
| 511 | Landing Marking | 460 | 460 | 460 | Generic Landing Marking Light on Heliport Approach System | 0.9 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 512 | Amber Light | 463 | 463 | 463 | Heliport Approach Landing Marking Amber Light | 0.9 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 513 | Green Light | 463 | 463 | 463 | Heliport Approach Landing Marking Green Light | 0.9 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 514 | Red Light | 464 | 464 | 464 | Heliport Approach Landing Marking Red Light | 0.9 | 1 1 1 | Dir | 75 | 10 | — | — | — |
| 515 | Edge | 469 | 469 | 469 | Generic Heliport Edge Lights | 0.9 | 0 0 1 | Omni | — | — | — | — | — |
| 516 | White/White Light | 462 | 462 | 462 | White/White Heliport Edge Light | 0.9 | 0 0 1 | Omni | — | — | — | — | — |
| 517 | White Light | 461 | 461 | 461 | White Heliport Edge Light | 0.9 | 1 1 1 | Omni | — | — | — | — | — |

Annex M: CDB Directory Naming and Structure

Formerly Appendix M, Volume 2 of the OGC CDB Best Practice

With CDB version 3.2 (prior to the submission into the OGC), Appendix M was used to present the complete list of names allowed to construct the directories of the CDB. As of version 3.2 (as submitted into the OGC standards process), the appendix has been replaced by a combination of folder hierarchy and metadata files and controlled vocabularies delivered with the CDB Distribution Package.

The /CDB folder hierarchy provides a complete list of directory and file name patterns of the CDB; it summarizes the structure of the CDB presented in chapter 3, Volume 1: Core. The following files are necessary to expand the patterns:

- /CDB/Metadata/Feature_Data_Dictionary.xml provides the list of directory names associated with feature codes;
- /CDB/Metadata/Moving_Model_Codes.xml provides the list of names for DIS Entity Kinds, Domains, and Categories; and
- /CDB/Metadata/DIS_Country_Codes.xml contains the list of DIS Country Names.

Together, these files provide all the information required to build the names of all directories permitted by the CDB standard.

Annex O: List of Texture Component Selectors

Formerly Appendix O, Volume 2 of the OGC CDB Best Practice

The following table provides the list of codes to use to build CDB model texture filenames.

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
| 002 – Month | 001 | January |
| | 002 | February |
| | 003 | March |
| | 004 | April |
| | 005 | May |
| | 006 | June |
| | 007 | July |
| | 008 | August |
| | 009 | September |
| | 010 | October |
| | 011 | November |
| | 012 | December |
| 003 – Season | 001 | Spring |
| | 002 | Summer |
| | 003 | Autumn |
| | 004 | Winter |

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|--------------------------------|---------------------------------|--------------------|
| 004 – Uniform Paint Scheme | 001 | Grey |
| | 002 | White |
| | 003 | Green |
| | 004 | Black |
| | 005 | Beige |
| | 006 | Blue |
| | 007 | Red |
| | 008 | Yellow |
| | 009 | Brown |
| | 010 | Pink |
| | 011 | Purple |
| | 012 | Burgundy |
| | 013 | Orange |
| | 014 | Light Blue |
| | 015 | Khaki |
| | 016 | Dark Grey |
| | 017 | Amber |
| | 018 | Gold |
| | 019 | Silver |
| | 020 | Copper |
| 005 – Camouflage Paint Scheme | 001 | Desert |
| | 002 | Winter |
| | 003 | Forest |
| | 004 | Generic |
| | 005 | Urban |

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|----------------------------|--------------------------|-------------|
| 006 – Airline Paint Scheme | | |
| | | |

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
|-------------------------|--------------------------|-------------|
|-------------------------|--------------------------|-------------|

| | | |
|--------------------------------|---------------------------------|----------------------------|
| | 277 | GCR Tianjin Airlines |
| | 278 | VOI Volaris |
| Texture Kind CS1 (Sxxx) | Texture Index CS2 (Txxx) | Description |
| | 280 | LNI Lion Air |
| | 281 | RYR Ryanair |
| | 282 | SHU Aurora |
| | 283 | NIG Aero Contractors |
| | 284 | SCW Malmö Aviation |
| | 285 | NAX Norwegian Air Shuttle |
| | 286 | RAR Air Rarotonga |
| | 287 | CJR Caverton Helicopters |
| | 288 | KZR Air Astana |
| | 289 | ROU Air Canada Rouge |
| | 290 | DWT Darwin Airline |
| | 291 | UTA UTair Aviation |
| | 292 | AZN Amazonas |
| | 293 | FDB Flydubai |
| | 294 | UZB Uzbekistan Airways |
| | 295 | PGT Pegasus Airlines |
| | 296 | ABY Air Arabia |
| | 297 | AXB Air India Express |
| 009 – Quarter | 001 | First quarter of the year |
| | 002 | Second quarter of the year |
| | 003 | Third quarter of the year |
| | 004 | Fourth quarter of the year |
| 054 – Contaminant | 001 | Wet Surface |
| | 002 | Snowy Surface |
| | 003 | Icy Surface |
| | 004 | Slushy Surface |
| | 005 | Patchy Wet Surface |
| | 006 | Patchy Snowy Surface |
| | 007 | Patchy Icy Surface |
| | 008 | Patchy Sandy Surface |
| | 009 | Patchy Dirty Surface |
| | 010 | Volcanic Ash |
| | 011 | Patchy Volcanic Ash |
| 055 – Skid Mark | 001 | Tire Mark |

Examples:

- A geospecific City Hall especially decorated for the Halloween during the month (S002) of October (T010) could have a texture named Geocell_D301_S002_T010_LOD_UREF_RREF_City-Hall.rgb.
- The texture of a geotypical house used during the first (T001) quarter (S009) of the year could be named D501_S009_T001_Wxx_House.rgb.
- Similarly, the uniform (S004) grey (T001) texture used with a Cobra helicopter could be named D601_S004_T001_Wxx_Cobra.rgb.
- A 1024 by 1024 (W10) texture representing an M1A2 tank desert (T001) camouflage (S005) could be stored in a file named D601_S005_T001_W10_M1A2.rgb.
- An Airbus 380 model 800 operated by the Emirates (T221) Airlines (S006) could be stored in a file named D601_S006_T221_Wxx_A380-800.rgb.

Notes:

- Texture Kind 002 and 009 are complete; the number of months and quarters will not change.
- Texture Kind 004 will expand as new colors are added. Color names are defined here: <http://en.wiktionary.org/wiki/Appendix:Colors>.
- Texture Kind 005, the Camouflage Paint Scheme, follows a similar numbering scheme as the HLA's RPR-FOM Version 2 Draft 17. The list will expand as new camouflages are needed or new values added to the RPR-FOM.
- Texture Kind 006 will expand as ICAO assigns new airline acronyms.
- Texture Kind 054 and 055 will expand as new contaminants and skid marks are deemed necessary.

Annex Q: Table of Dataset Codes

Formerly Appendix Q in Volume 2 of the OGC CDB Best Practice.

The table below summarizes the CDB dataset codes along with their names and their applicability to the community 3.0 specification and the OGC standard, which is based on CDB version 3.2.

| Dataset | | Specification | |
|------------------------------|------|---------------|-----|
| Name | Code | 3.0 | OGC |
| Elevation | 001 | √ | √ |
| MinMaxElevation | 002 | √ | √ |
| MaxCulture | 003 | √ | √ |
| Imagery | 004 | √ | √ |
| RMTexture | 005 | √ | √ |
| RMDescriptor | 006 | √ | √ |
| Reserved | 007 | | |
| Reserved | 008 | | |
| Reserved | 020 | | |
| GSFeature | 100 | √ | √ |
| GTFeature | 101 | √ | √ |
| GeoPolitical | 102 | √ | √ |
| VectorMaterial | 200 | √ | √ |
| RoadNetwork | 201 | √ | √ |
| RailRoadNetwork | 202 | √ | √ |
| PowerLineNetwork | 203 | √ | √ |
| HydrographyNetwork | 204 | √ | √ |
| GSMoelGeometry | 300 | √ | √ |
| GSMoelTexture | 301 | √ | √ |
| GSMoelSignature | 302 | √ | √ |
| GSMoelDescriptor | 303 | √ | √ |
| GSMoelMaterial | 304 | | √ |
| GSMoelInteriorGeome try | 305 | | √ |
| GSMoelInteriorTextur e | 306 | | √ |
| GSMoelInteriorDescri ptor | 307 | | √ |
| GSMoelInteriorMateri al | 308 | | √ |

| Dataset | | Specification | |
|-------------------------------|-----|---------------|---|
| GSMoelCMT | 309 | | √ |
| T2DMoelGeometry | 310 | | √ |
| GSMoelInteriorCMT | 311 | | √ |
| T2DMoelCMT | 312 | | √ |
| T3DMoelGeometry | 320 | | √ |
| T3DMoelTexture | 321 | | √ |
| T3DMoelMaterial | 322 | | √ |
| T3DMoelInteriorGeom etry | 323 | | √ |
| T3DMoelInteriorTextu re | 324 | | √ |
| T3DMoelInteriorMate rial | 325 | | √ |
| NavData | 400 | √ | √ |
| Navigation | 401 | √ | √ |
| GTModelGeometry | 500 | √ | √ |
| | 510 | | √ |
| GTModelTexture | 501 | √ | |
| | 511 | | √ |
| GTModelSignature | 502 | √ | |
| | 512 | | √ |
| GTModelDescriptor | 503 | √ | √ |
| GTModelMaterial | 504 | | √ |
| GTModelCMT | 505 | | √ |
| GTModelInteriorGeome try | 506 | | √ |
| GTModelInteriorTextur e | 507 | | √ |
| GTModelInteriorDescri ptor | 508 | | √ |
| GTModelInteriorMateri al | 509 | | √ |
| GTModelInteriorCMT | 513 | | √ |
| MModelGeometry | 600 | √ | √ |
| MModelTexture | 601 | √ | √ |
| MModelSignature | 602 | √ | |
| | 606 | | √ |
| MModelDescriptor | 603 | √ | √ |

| Dataset | | Specification | |
|-----------------------------|-----|---------------|---|
| MModelMaterial | 604 | | √ |
| MModelCMT | 605 | | √ |
| Metadata | 700 | | √ |
| ClientSpecific | 701 | | √ |
| Reserved for CDB Extensions | 9xx | | |

| | |
|---|----------------------------|
| | Dataset Code is not used |
| | |
| √ | Dataset Code is in use |
| | |
| | Dataset Code is deprecated |
| | |
| | Dataset Code is reserved |

Annex R: Derived Datasets within the CDB

By using Industry Standards throughout this document, the CDB Standard defines the means and mechanisms to populate all the simulation datasets without involving data duplication. However, there are situations where a specific dataset information type needs to be derived from another existing one in order to specialize further the information into another dataset type or form.

This consideration becomes a grey area where the off-line tools' capability and the run-time simulation clients' performance levels enforces this data derivation.

It is such a case with the Mip-Map data, Min-Max Elevation data, Tile Presence data, RCS data, and Raster Material data for example.

| Source Dataset | Data Manipulation Description | Resulting Dataset(s) |
|-------------------|---|----------------------|
| Elevation Dataset | In order to produce the various Level Of Details within the Elevation Dataset, it is often necessary to over-sample or sub-sample a primary set of data values. Since those values within the LOD hierarchy may come from a single data source, the LODs can be seen as derived information which can better accommodate the client needs based on their performance level. | Elevation LODs |

| Source Dataset | Data Manipulation Description | Resulting Dataset(s) |
|-------------------|---|----------------------|
| Elevation Dataset | <p>For clients that need to compute line of sights (LOS) between simulation entities spread across a vast terrain area, it is imperative to have a fast way of knowing the minimum and maximum elevations within a tile without loading the entire elevation data grid. The min/max elevation dataset can be used to ensure a fast pre-determination of entities occultation state with the terrain. The min/max data is stored in the form of a quad-tree pyramid and is based on the area covered at the given depth level of the quad-tree. For example, for the maximum dataset the top will contain the maximum for the whole of the geocell, the next pyramid level contains maximum data for each the quarter geocells and so on. Similarly for the minimum the top represents the minimum for the whole of the geocell going down as for maximums. Currently the pyramid size is fixed and goes down to level 9 which covers areas that are approximately 256x256 meters square; note that the depth level can be modified to a finer or coarser level but level 9 is suggested as a reasonable compromise of performance vs. storage. A tool will pre-determine the minimum and maximum elevations within a geocell's elevations and generate the quad-trees described previously; note that the tool will use all of the elevation data that is present in the elevation dataset to determine the maximums or minimums in a given area. The tool will provide Min-Max values to client devices through the Min-Max Elevation datasets in the CDB.</p> | Min-Max Elevation |

| Source Dataset | Data Manipulation Description | Resulting Dataset(s) |
|--|--|---------------------------|
| Vector Datasets (Point, Lineal and Areal Features) | The Max Culture Height data is produced for clients that need to compute line of sights (LOS) between simulation entities spread across a vast terrain area that take into account the maximum cultural feature heights. The dataset helps rapidly assess an intersection status of line-of-sight with cultural features. This dataset is derived from the Vector Datasets of the CDB for corresponding tiles. The storage is done via a quad-tree similar to that of the min/max elevation the top of the pyramid represents the height of the highest cultural feature in the dataset going down to a suggested depth level of 9. | Max Culture Height |
| 3D Model (GT, GS, MM) Datasets | The polar diagram data (covering all aspect angles) of the RCS dataset for Geotypical, Geospecific or Moving Models cannot readily be computed at run-time due to the complex mathematical computing algorithms and resources required to determine the Electro-Magnetic Energy absorption levels by the model's materials, the corner reflections, the multi-path reflections, EM parameters (frequency, polarization) effects, and so on. Therefore, off-line COTS tools are used to analyze the 3D model geometry and its materials in order to produce the RCS dataset specifically for different frequencies and polarizations. | RCS (Radar Cross Section) |
| Vector Datasets (Point, Lineal and Areal Features) | Since the material attribution is normally done in the vector data, a rasterization operation among all features is required to come up with a raster grid of attributed materials. | Raster Material |

Annex S: Default Read and Write values for Simulator Client-Devices

As seen throughout this document, the CDB standard provides guidelines with respect to default values in cases where no data could be read from the CDB for requested datasets. Those default parameters are captured in a Metadata file within the CDB. The Table below summarizes all the Default Parameters Names and the suggested initial values to be used by client-devices. In cases where the default parameter would be missing altogether from \CDB\Metadata\Defaults.xml, Client-Devices shall use the “Default Value” found in the fourth column. A “Read” default refers to the value being assumed while reading the CDB data. A “Write” default refers to the value being written to the file when content-generation tools have partial source data.

| Parameter Name | Dataset | Type | Default Value | R/W |
|---------------------------------------|---------------------|---------|---------------------|-----|
| Default_Elevation-1 | 001_Elevation | float | 0 m | R |
| Default_Elevation-[2-99] | 001_Elevation | float | 0 m | R |
| Default_Primary_Elevation_Control | 001_Elevation | integer | INSIDE (1) | R |
| Default_Subordinate_Elevation_Control | 001_Elevation | integer | NO_ELEVATION (0) | R |
| Default_Bathymetry | 001_Elevation | float | 0 m | R |
| Default_Tide | 001_Elevation | float | 2.5 m | R |
| Default_MinElevation_CaseI | 002_MinMaxElevation | float | Default_Elevation-1 | R |
| Default_MaxElevation_CaseI | 002_MinMaxElevation | float | Default_Elevation-1 | R |
| Default_MinElevation_CaseII | 002_MinMaxElevation | float | -400 m | R |
| Default_MaxElevation_CaseII | 002_MinMaxElevation | float | 8846 m | R |
| Default_MinElevation_CaseIII | 002_MinMaxElevation | float | 8846 m | W |
| Default_MaxElevation_CaseIII | 002_MinMaxElevation | float | -400 m | W |
| Default_MaxCulture_CaseI | 003_MaxCulture | float | 600 m | R |
| Default_MaxCulture_CaseII | 003_MaxCulture | float | 0 m | R |
| Default_VSTI_Y_Mono | 004_Imagery | float | 0.5 | R |

| Parameter Name | Dataset | Type | Default Value | R/W |
|--------------------------------------|----------------------------|---------|---------------|-----|
| Default_VSTI_Y_Red | 004_Imagery | float | 0.5 | R |
| Default_VSTI_Y_Green | 004_Imagery | float | 0.5 | R |
| Default_VSTI_Y_Blue | 004_Imagery | float | 0.5 | R |
| Default_VSTLM_Mono | 004_Imagery | float | 0.0 | R |
| Default_VSTLM_Red | 004_Imagery | float | 0.0 | R |
| Default_VSTLM_Green | 004_Imagery | float | 0.0 | R |
| Default_VSTLM_Blue | 004_Imagery | float | 0.0 | R |
| Default_Imagery_Gamma | 004_Imagery | float | 1.0 | R |
| Default_RoadNetwork_LTN | 201_RoadNetwork | integer | 2 | R |
| Default_RailRoadNetwork_LTN | 202_RailRoadNetwork | integer | 1 | R |
| Default_GSModelTexture_Gamma | 301_GSModelTexture | float | 1.0 | R |
| Default_GSModelInteriorTexture_Gamma | 306_GSModelInteriorTexture | float | 1.0 | R |
| Default_GTModelTexture_Gamma | 511_GTModelTexture | float | 1.0 | R |
| Default_GTModelInteriorTexture_Gamma | 507_GTModelInteriorTexture | float | 1.0 | R |
| Default_MModelTexture_Gamma | 601_MModelTexture | float | 1.0 | R |
| Default_Base_Material | | string | BM_LAND-MOOR | R |
| Default_Material_Layer | | integer | 0 | R |
| Default_AO1 | | float | 0.0 | R |
| Default_SCAL[x,y,z] | | float | 1.0 | R |
| Default_TRF | | integer | 4 | R |

Annex Y: Revision History

| Date | Release | Editor | Primary clauses modified | Description |
|------------|---------|---------|--------------------------|-------------------------|
| 2017-02-23 | 1.0 | C. Reed | All | |
| 2018-08-28 | 1.1 | C. Reed | All | |
| 2019-12-16 | 1.2 | C. Reed | Various | Changes for version 1.2 |

Annex Z: Bibliography