MapLib – Map tile retrieval library

Nov 2023 Update see notes below marked with Nov23

Supported Map Providers

MapLib supports a fixed number of Map Tile Providers as well as 6 user defined ones.

➔ ALWAYS consider the terms of use for any of the map providers

Free and open Tile services are at the time of writing – enabled by default
OpenStreetMap (OSM) and some derivatives

https://www.openstreetmap.org

OpenTopo, a 3d enhanced map from an open source project.

https://opentopomap.org

Nov23 **Stadiamaps.com** / STAMEN TERRAIN – disabled by default

Stamen 3D shaped terrain map is now served by Stadia Maps and **requires a Key** (a free subscription exists) therefore Stamen is now default Disabled, URLs have been updated, see below how to enable it

https://stadiamaps.com/stamen/

ChartBundle.com – disabled by default

https://www.chartbundle.com/charts/

Free aviation charts with limited coverage (FAA airspace)

Tile Services which need either a key or are subject to licensing terms – disabled by default

Bing Maps (Microsoft map service) needs a key and subject to licensing

https://docs.microsoft.com/en-us/bingmaps/getting-started

ESRI/ARCGIS Tile Services as part of their offering – subject to license, don't use if not licensed

https://developers.arcgis.com/documentation/mapping-apis-and-services/data-hosting/services/image-tile-service/

Remark:
Don't ask for Google Map support – I don't have a key and they are rather complicated to work with…

User defined tile services 1..6

You may have an own tile service running on your NAS or know a tile service you like to use.
The URL to be provided looks like:

```
Http=https://ip_or_address/route/{z}/{y}/{x}.imageformat
```

Where the {z} {y} {x} parts will be replaced by the requested zoom and coordinates.
The library expects a Mercator Tile Set with 0/0 top left tile number and 256x256 sized tiles – PNG and JPG image formats are supported.

Example:

```
Http=https://myNas:23356/tiles/{z}/{y}/{x}.jpg
```

Data retrieval and storage disclaimer

MapLib retrieves tiles only for the user requested location and zoom level.
The visualization WinForms UserControl **bm98_Map** requests tiles as a matrix of 8x8 tiles at zoom levels for the 5 different ranges: XF=7, FF= 9, F=11, M= 12, N=13, C=15
With AutoRange enabled it will load tiles from zoom level 6 to 15 when zooming the Map

MapLib stores tiles per provider in a computer local disk cache and will clean up tiles older than 100 days or when the providers cache exceeds the size limit at startup of the application.

Nov23 You may define a Disk Cache size from 32MB to 1024MB using the Ini file (see below)
Default is ~128MB / ~5120 tiles

MapLib maintains a memory cache for 800 tiles (about 20 MB RAM) while an application is running.
→ If you encounter incorrect tiles or other oddities – first delete the cache files and try again.

The download task will comply with OSM policy i.e. only 2 concurrent tile download threads.

INI File

Configuration goes via an **INI File** (`MapLibProvider.ini`) located per default in the **Applications directory**.

IF the Library finds a MapLibProvider.ini file in a user folder (**`MyDocuments\MSFS_HudBarSave`**) it takes preference over the default one.
I.e. if you change INI settings, first copy the original file to this folder and make changes there, else it will be overwritten when extracting a new version from the Zip file

- The INI file consists of the Main section + a number of Provider sections
- INI files consists of lines where everything after a semicolon <;> is considered as comment.
- INI files do have a Keyword and a content in the form of: Keyword=Content
- INI files do have sections which start with a bracketed Name: [Section]
- The part of the INI file which is not lead by a section name is the Main Section

➔ INI files are text files, use **only** Notepad or similar editors, never Word or other text processing programs to edit it's content

Main Section

`DefaultProvider= ..` → Default Provider and tiles the Map starts with

Use any of the enabled [ProviderNames] found in the later sections Use the exact name, or uncomment the template ones, only the first entry in the file is considered.

`Example:`

```
DefaultProvider=OSM_OpenStreetMap
```

`BingKey= ..` → A Key to use Bing Maps (see remark below)

A rather large number of characters provided by BING Maps in order to access their map services, visit URLs below at Microsoft

https://docs.microsoft.com/en-us/bingmaps/getting-started

https://docs.microsoft.com/en-us/bingmaps/getting-started/bing-maps-dev-center-help/getting-a-bing-maps-key

`StadiaStamenKey= ..` → A Key to use Stamen Maps (see remark below) Nov23

A rather large number of characters provided by Stadia Maps in order to access their map services, visit URLs below at Stadia Maps

https://stadiamaps.com/stamen/

`DiskCacheMB=128` → A number 32..1024 to set the disk cache size in MB per provider (128 default) Nov23

Provider Sections:

`[ProviderName]` → Provider name – don't change, the library expects those names

`Name=…` → The name shown in the selection list

`Enabled=…` → `True` if the provider is enabled else `False`
To enable a provider set this entry to True, to disable use False
Enabled providers will show up in the map selection to choose from.
The free providers are enabled in the INI file, not so free ones and chartbundle disabled.

`Example:`

`Enabled=True`

`Http=…` → The map tile server address, most don't need an entry and are listed as comment for reference.
For OSM one could use a variety of specialized servers in order to get e.g. names in another language than OSM provides them, e.g. the .de server will supply translated city names for parts of Asia.
For the User Entries see below.

`Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat`

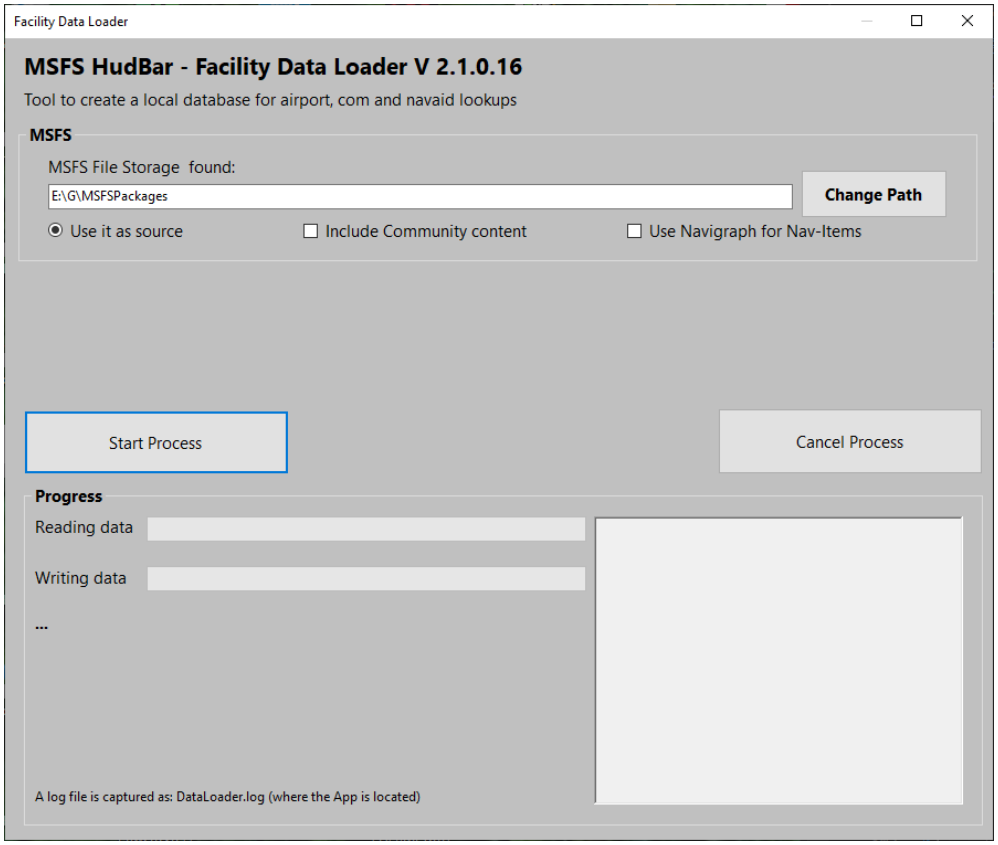
Where the {z} {x} {y} parts will be replaced by the requested zoom and coordinates.
The library expects a Mercator Tile Set with 0/0 top left tile number and 256x256 sized tiles – PNG and JPG image formats are supported.

Example: see above

Data Loader

Go for the application folder and then into the subfolder `\dataLoader`

Run `FacilityDataLoader.exe`:



First check if the program finds the MSFS data path.
It does follow the MS specs for Store and Steam but…

If not you may need to use Change Path.. to point it to the folder (where Community and Official folders can be found)

Nov23 Sourcing from LNM is currently unavailable ~~If the LittleNavMap database is found it will show it as well.~~

You may choose the source for the data, either collecting from the MS files where you may include Community content and/or Navigraph (if installed)

Check the sources.
Then hit Start Process and have some patience.
The program will report progress and once it finished its data collection it will tell you.

Nov23 To serve all new functionality of the FlightBag a lot more data is collected and the size has increased to 450MB. The database is new V2 (`fs2020genAptV2.dblite`), the old one is not deleted.

The database is stored at `MyDocuments\MSFS_HudBarSave\db\fs2020genAptV2.dblite` and is about 450MB.

REDO this process when either a new Navigraph version is out and when MS provides substantial updates.

APPENDIX (default INI File):

```
; MapLib Provider Overrides
;
;  Format:
;  /// DefaultProvider=PROVIDER
;  /// BingKey=KEY
;  ///
;  /// [PROVIDER]
;  /// Name=a name
;  /// Enabled=true / false
;  /// Http=URL
;
; Text after a semicolon is treated as comment
;
; => File name must be 'MapLibProvider.ini'
;
; Define the DefaultProvider from the [PROVIDER] names
;
; In each providers section:
;   Set 'Enabled=true' to be able to use it
;   Change Name=new name     if you don't like it
;
;   Uncomment 'Http=http....' to override the URL used to retrieve map tiles
;    -> If unsure, leave it alone (The App may break or not respond any longer)
;
; For URLs:
;   There are 3 placeholders for {x},{y},{z} (xy tile coords + zoom)
;   When multiple server subdomains are available - {s} can be used
; For some you need an accees key (personal, subscription etc)
;   Key=sadfsdfsdf
;
;  NOTE there is no privacy or protection when typing the key here
;       the key is only used in the tile loading HTTP request as per provider guidance
;
;
; Default Provider to use => one of the Provider Chapter IDs ([NAME] from below)
DefaultProvider=OSM_OpenStreetMap    ; OSM_OpenStreetMap is the free default provider

;DefaultProvider=OpenTopo

; Here comes your Bing Map Key if you want to use Bing Maps
BingKey=<YOUR KEY>

; Here comes your Stadia Key for Stamen Maps
StadiaStamenKey=<YOUR KEY>

; Disk Cache per Provider in MB default 128MB (from 32 to 1024 max)
; Remove semicolon to enable your setting
;DiskCacheMB=128

; PROVIDER SECTIONS

[OSM_OpenStreetMap]
; OpenStreetMap (see terms of use before using it)
Name=OSM OpenStreetMap
Enabled=true   ; should never be disabled
;Http=https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png  ; default, labeled according to the region (e.g. Japanese etc)
;Http=https://{s}.tile.openstreetmap.de/{z}/{x}/{y}.png   ; adds translated names to the local ones
;Http=https://{s}.tile.openstreetmap.fr/osmfr/{z}/{x}/{y}.png ; focus on french translation; international items are partly translated

[OpenTopo]
; Street Map 3D enhanced
; OpenTopo (see terms of use before using it)
Name=OpenTopo
Enabled=true
;Http=https://{s}.tile.opentopomap.org/{z}/{x}/{y}.png  ; default
;Http=https://a.tile.opentopomap.org/{z}/{x}/{y}.png  ; without subdomain

[Stamen_Terrain]
; Street Map 3D shaped
; NEW Oct.2023 served by Stadia - needs a Key see
; https://docs.stadiamaps.com (see terms of use before using it)
Name=Stamen 3D Street Map
Enabled=false
;Http=https://tiles.stadiamaps.com/tiles/stamen_terrain/{z}/{x}/{y}.png?api_key=YOUR-API-KEY

; **********
; From http://www.chartbundle.com/charts/  see terms of use
; For US regions only (FAA provides data at no cost, other countries do not...)
;   Disabled per default - change: Enabled=true   to get the ones you need
; **********
[CB_SEC]
; Sectional Charts
Name=CB Sectional Charts
Enabled=false
;Http=https://wms.chartbundle.com/tms/1.0.0/sec/{z}/{x}/{y}.png?origin=nw  ; default

[CB_TAC]
; Terminal Area Charts
Name=CB Terminal Area Charts
```

```
Enabled=false
;Http=https://wms.chartbundle.com/tms/1.0.0/tac/{z}/{x}/{y}.png?origin=nw  ; default

[CB_ENRA]
; IFR Area Charts
Name=CB IFR Area Charts
Enabled=false
;Http=https://wms.chartbundle.com/tms/1.0.0/enra/{z}/{x}/{y}.png?origin=nw  ; default

[CB_ENRL]
; IFR Enroute Low Charts
Name=CB IFR Enroute Low Charts
Enabled=false
;Http=https://wms.chartbundle.com/tms/1.0.0/enrl/{z}/{x}/{y}.png?origin=nw  ; default

[CB_ENRH]
; IFR Enroute High Charts
Name=CB IFR Enroute High Charts
Enabled=false
;Http=https://wms.chartbundle.com/tms/1.0.0/enrh/{z}/{x}/{y}.png?origin=nw  ; default


; ***************
; Microsoft Bing MAPS (needs a Key to access ->  https://www.microsoft.com/en-us/maps/create-a-bing-maps-key)
; ***************
; Note: Bing URLs are retrieved dynamically and changing the Provider here has no effect (for reference only)

[Bing_Imagery]
; Satellite Imagery
Name=Bing Satellite Imagery
Enabled=false
;Http=https://ecn.{subdomain}.tiles.virtualearth.net/tiles/a{quadkey}.jpeg?g=12552 ; not used, for reference only

[Bing_ImageryLabels]
; Satellite Imagery with road labels
Name=Bing Satellite Imagery w. Labels
Enabled=false
;Http=https://ecn.{subdomain}.tiles.virtualearth.net/tiles/h{quadkey}.jpeg?g=12552&mkt={culture} ; not used, for reference only

[Bing_OStreetMap]
; Street Map
Name=Bing OSM StreetMap
Enabled=false
;Http=https://ecn.{subdomain}.tiles.virtualearth.net/tiles/r{quadkey}.jpeg?g=12552&mkt={culture}&shading=hill ; not used, for reference only


; ***************
; ESRI/ARCGIS Maps (subject to terms of use - your at your own here...)
; ***************

[ESRI_Imagery]
; Satellite Imagery
; ESRI/ARCGIS World Imagery (see terms of use before using it)
Name=ESRI/ARCGIS World Imagery
Enabled=false
;Http=https://services.arcgisonline.com/arcgis/rest/services/World_Imagery/MapServer/tile/{z}/{y}/{x}  ; default

[ESRI_StreetMap]
; Street Map
; ESRI/ARCGIS StreetMap (see terms of use before using it)
Name=ESRI/ARCGIS StreetMap
Enabled=false
;Http=https://services.arcgisonline.com/arcgis/rest/services/World_Street_Map/MapServer/tile/{z}/{y}/{x}  ; default

[ESRI_WorldTopo]
; Street Map 3D shaped
; ESRI/ARCGIS WorldTopo (see terms of use before using it)
Name=ESRI/ARCGIS WorldTopo
Enabled=false
;Http=https://services.arcgisonline.com/arcgis/rest/services/World_Topo_Map/MapServer/tile/{z}/{y}/{x}  ; default


; ***************
; USER Maps (your at your own here...)
; ***************

[USER_TILES_1]
; User defines Tile Server No 1
Name=User Tiles 1
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful

[USER_TILES_2]
; User defines Tile Server No 2
Name=User Tiles 2
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful

[USER_TILES_3]
; User defines Tile Server No 3
Name=User Tiles 3
```

```
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful

[USER_TILES_4]
; User defines Tile Server No 4
Name=User Tiles 4
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful

[USER_TILES_5]
; User defines Tile Server No 5
Name=User Tiles 5
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful

[USER_TILES_6]
; User defines Tile Server No 6
Name=User Tiles 6
Enabled=false
;Http=https://ip_or_address/route/{z}/{x}/{y}.imageformat ; MUST be changed to something meaningful
```