DOCUMENT OF THE MIRAMON V. 7 NEWS

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INDEX

1. Introduction

This document describes the main features of v.7.0 of MiraMon in relation to v. 6.0. MiraMon is a software intended to be used in Cartography, Geographic Information Systems (GIS), Remote Sensing, Spatial Analysis and related disciplines. The present summary, therefore, includes the successive improvements of version 6 and new aspects of v. 7 (some of which appeared in v. 6.4 and have been consolidated in version 7). To see the news of previous versions, 5 and 6, they can be downloaded from:

www.creaf.uab.cat/miramon/new_note/cat/notes/new_v5.pdf and

www.creaf.uab.cat/miramon/new_note/cat/notes/Novetats_v6_eng.pdf .

It is strongly recommended reading this document if you are not very familiar to versions 5 or 6.

The most advanced aspects are in smaller font, only of interest in a second reading or for expert users.

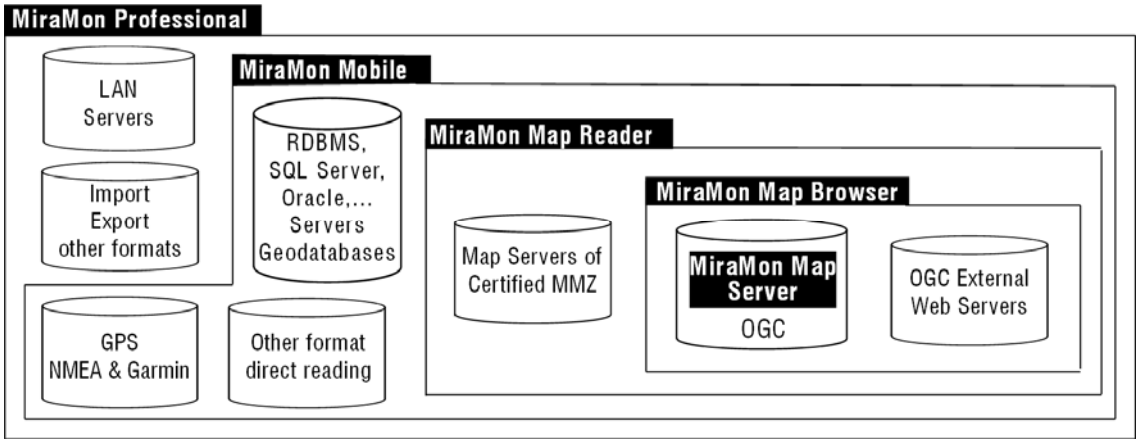
In this section, **MiraMon** refers to the entire **MiraMon** *software* while **MM32** refers to core module, which is used for displaying, querying, printing, scanning and graphic editing, etc. The ***"Professional MiraMon"*** refers to the complete MiraMon (licensed and with dozens of features on spatial analysis, topological structure, remote sensing, etc), as opposed to the ***"MiraMon Map Reader"*** and the ***"MiraMon Map Browser"*** for Internet, offering the most basic functionalities and are intended for non sophisticated public use (basically for displaying, simple queries and printing).

It must also be considered the existence of the following products:

- ***"MiraMon Map Server",*** a powerful application that provides various services efficiently (WMS, WMTS, WCS, WFS, etc) that follow the standardization set by **Open Geospatial Consortium (OGC)** and other especially useful associated features (files downloading based on the display scope, indicated by a map browser, displaying console processes, film animated temporal series, etc.).
- ***MiraMon Mobile,*** a new application in v.7, which runs on devices such as PDAs with Windows operating system and that is described in some detail later.

The following outline recalls the main ways of access to geographical information from different applications of MiraMon. As one can see, Professional MiraMon provides access to its own bases in **corporate Local Network Servers (LAN)** (including access to MDB databases, Oracle, MS SQL Server, etc), **importing and exporting to other formats, communicating with GPS receivers** in real time or post-processing, **accessing in a transparent way to MMZ bases** published by other organizations, or navigating on bases

offered by any manufacturer that follow OGC standardization. In the latter case, MiraMon servers offer advantages such as a higher access speed, data downloading and real metadata downloading (not just screen display captures), etc. The application and the installation mechanism are fully compatible with all versions of Windows 32-bit, from Windows 98 to Windows Vista (Windows 95 support has been withdrawn, although the vast majority of functions are still operational); regarding Windows 7, the program works correctly on versions 32 and 64 bit. In the case of the application MiraMon Mobile, it operates in version 5 of Windows CE and Windows Mobile 6.



This section *does not include minor tweaks and troubleshooting solutions that are being made,* but they are all documented in the MiraMon Versions' Diary available at http://miramon.uab.cat/vers_mm . Note that in the Diary it is possible:

- To see a full list of news (historic from 2002).
- To browse for logs sorted by news date, corrections that are being made, etc.
- To do advance searches. For example, one can search all records-dates- where references were made to the "single table" ("with" operator) in 2007 or in a certain version of the program.
- To subscribe to MiraMon news on your favourite syndicated content reader (via RSS), which means one can be more easily updated about the news, corrections, etc, that are being introduced.

Some outstanding features of Version 7 of MiraMon (already performed or planned):

The MiraMon easier to use
Favourite maps (at the beginning and as later opening). Simplification and restructuring of the "File" menu.
Streets maps and other location sources (names, etc).
Templates for searching by location.
Search of data in an optimized catalogue.
Less selective when opening files, navigating and closing files.

Zoom ruled by 64-bit integers that can go continuously from the whole World view to sub-millimetre details. Possibility of using the mouse wheel (when there is) as a tool to change the zoom level. Move mode automatically activated ("pan") by simply clicking the mouse and dragging it.
The more visual MiraMon (symbolization)
Patterns in polygons.
Patterns in lines.
Manual symbolization (by user-defined intervals and with descriptors that can be independent from the original attribute).
Automatically shaded maps.
The more interactive MiraMon
Dynamic information about scale and about pixel screen size when scrolling into the Zoom bar. Information about the Z coordinate at any time.
Automatic 3D Models (perspective).
Automatic change projection.
Interactive digitalization of topological polygons.
The most compatible MiraMon
Enhancements in version for PDAs.
Study of starting a MiraMon Linux version or increased compatibility with Windows emulators within Linux and other operating environments.
The more standard MiraMon
Many improvements to the Metadata Manager, GeMM in line with the international standardization.
Reading and writing GML.
Searching in CSW catalogues.
Reading WFS.
Beginnings of WPS.
Reading WMTS (and writing in the Server).
The most complete MiraMon
More analytical operations (principal component analysis robust to NODATA values, logistic regression, contour line generation, MDE errors, etc).
Queries with more topological information.
Incorporation of more Remote Sensing tools.
Metadata flow process additional to the current processes.

Tools for chaining processes (modelling).
The most powerful and robust MiraMon
Error correction
Improvement of the program's documentation
Very substantial reduction of waiting times in the process of drawing WMS resources by taking advantage of information already downloaded.
Increasing the presence of parallelization processes for a quality improvement in speed.
Beginning the 64 bits codification in all these areas where beneficial (zooms, management of especially large files, etc).
The MiraMon more corporate and collaborative
New corporate MiraMon.par, where one can define preferences in terms of individual, group or corporation
Register user's profile (online last resource opened (WMS, etc), last collection of favourite maps which has been used, etc).
Possibility of sharing preferred collections that a user or a corporation has created and that can be useful to other users

2. Environment and general interface

2.1. Collection of favourite maps in the new starting dialogue box of the program

When starting a software like MiraMon, the person more or less familiar with the Cartography world, Geographic Information Systems or Remote Sensing, easily finds in the menus familiar options to start working, such as "Open raster ... " (That was the first option the program had over 15 years ago), "Open RGB → 24-bit..." or "Open structured vector...". However, unless MiraMon has been opened from an MMZ website link or from a CD/DVD, a person with less knowledge on the subject, when opening the program, does not know where to begin to display territorial information or how to go to a specific place where just the name or the coordinates are known (a map, a GPS, etc). It is also true that even an expert, or a teacher in a classroom, often needs to have an easy reach to some maps with which he/she works most often, in the form of thematic collections, geographical areas, teaching program subjects, etc.

Therefore, in MiraMon v.7, the presentation dialogue box has a new mechanism that simultaneously responds to these two needs: to **open easily typical maps** (topographic, orthophotos, land cover, protected areas, etc) that conform **favourite collections** and **facilitate the user to locate in the map from the beginning.**

To meet the first goal, version 7 of the software incorporates an access mechanism to **collections of favourite maps.** As it can be seen in the illustration below, when opening MiraMon, to the left of the presentation

dialogue box appear a series of maps which belong to these collections of favourite maps, in this case "Catalonian typical Maps".

If the program does not detect the existence of collections of favourite maps, in the gap provided appears, instead, an HTML exploration box with examples of collection of favourite maps which can be downloaded from the MiraMon web site (Catalonian maps, Andorran maps, the Iberian Peninsula maps, etc) in case the user wants to download the maps given by default by the program. If there isn't Internet access at that time, the web address where collections are located is shown, so that it can be copied for later download or to download it from another computer that does have Internet connection.

The last collection offered is in fact the favourite maps web page allocated in a MiraMon server, so it offers an easy access to download another collection that had not yet been downloaded or to download an updated version of a collection.

When running an MMZ containing a collection, it is unzipped in the directory specified in MiraMon.par ('CollecDir=' key), which was defined during the MiraMon installation, and may be changed at any time by editing MiraMon.par from the "Help" menu.

A ***Collection* of *favourite maps*** is a set of maps (MMM files or MMZ files) that we use regularly and to which we facilitate access in an optimal way by displaying it on the program's homepage. Since an MMM file and an MMZ file contain any geographic information that can be opened with MiraMon (rasters and vectors of multiple formats, WMS maps located in the Internet, etc), maps

contained in collection of favourite maps can be of any nature that suits us. Collections of favourite maps that are distributed from MiraMon version 7, combine resources such as WMS, rasters, vectors, etc, as appropriate; for a better understanding of the map's description, in parentheses is specified the nature of the geographic information source. This is, as one can imagine, just a suggestion and not an obligation, and if one wants to make its own collections one can choose the desired explanatory texts.

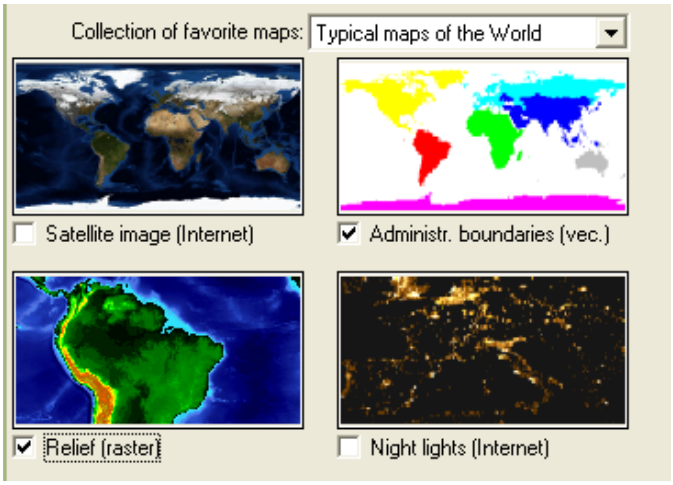
As you can see, each map is displayed through a small ***clickable thumbnail*** (the illustration is actually a button) under which there is a brief ***description of the map.*** The thumbnail does not have to correspond to the entire map scope, it can be a small part of the map; it depends on the choices of whoever designed this collection of favourite maps and the corresponding thumbnails considered representative of each map.

Each collection can be formed with as many maps as wanted. However, since only 8 thumbnails can fit in the box, to be big enough to be sufficiently illustrative, at the bottom of the box there are browser ***buttons***  that allow to go from page to page, and with as many pages as you need, to browse through maps of the same collection.

If you do not want to open any collection of favourite maps, simply press return, or press the ***"Continue ..."*** button (in essence it converges to the same number of "clicks" needed to open the program from previous versions of MiraMon).

Note, however, that there is now a button called ***"Cancel ...".*** This button is new in version 7, as it is now possible to disrupt the opening of MiraMon if invoked by mistake. As usual, the ***"Esc"*** button on your keyboard performs the same function.

The use of favourite maps by the user is simple: *If one presses into a thumbnail* of any map, *the program opens it immediately.* If we want to open more than one thumbnail simultaneously, we can select them through the small selection buttons that lay before each map description. Once the maps of interest have been selected (2 in the following illustration), we can click "Continue ..." and the program will proceed to open them, taking the overlapping criteria of locating layers that are usually more opaque and geographically more extensive (WMS and rasters) under vector layers, etc, in order to reduce the possibility of hiding layers when overlapping.



You can always go back to favourite maps via ***"File | Open favourites ..."*** or pressing the button from the toolbar buttons.

Location, declaration, definition, and all technical aspects to design your own collections are detailed in the document ***ColleccionsPreferides_i_CercaPerToponims_vx.*** Public administrators, teachers and users interested to have this document, please contact to suport@miramon.uab.cat. As explained in the document, as MiraMon.par version 7 can be configured differently for different users and groups of users of a corporation, the program can be set so ***different users see different collections of favourite maps.*** Maps, of course, can be shared as the collection is a reference to existing resources, either online or in the network or in local disk, and even multilanguage descriptions of the maps member of a collection are allowed.

Important Note 1: Since maps that conform a collection can use Internet geoservices, and these may change depending on scales, formats, etc, it is desirable to periodically update the collections (or if some strange behaviour in the use of these services is detected) through the button "Update server collection" from the box " File | Open Internet resources | Navigate WMS servers ", while not developed an automatic update notification system. When in a later MiraMon upgraded version, notices regarding a collection change will be sent asking permission to be updated, you can forget this note.

Important Note 2: If you generate typical collections that you think may be of interest to others and you want to share them, you can email us at contacte@miramon.uab.cat and they will be added to the common list, whether as a link or directly hosting them on our servers. Naturally, in all cases, the resources distributed keep, through the metadata and through the eventual certification, explicit recognition of whom is originally that distribution. Note that the favourite collections offer the possibility to prepare sets of geographical information of interest to diverse fields such as:

- Historic fields (e.g. political divisions map collections at different periods of time.

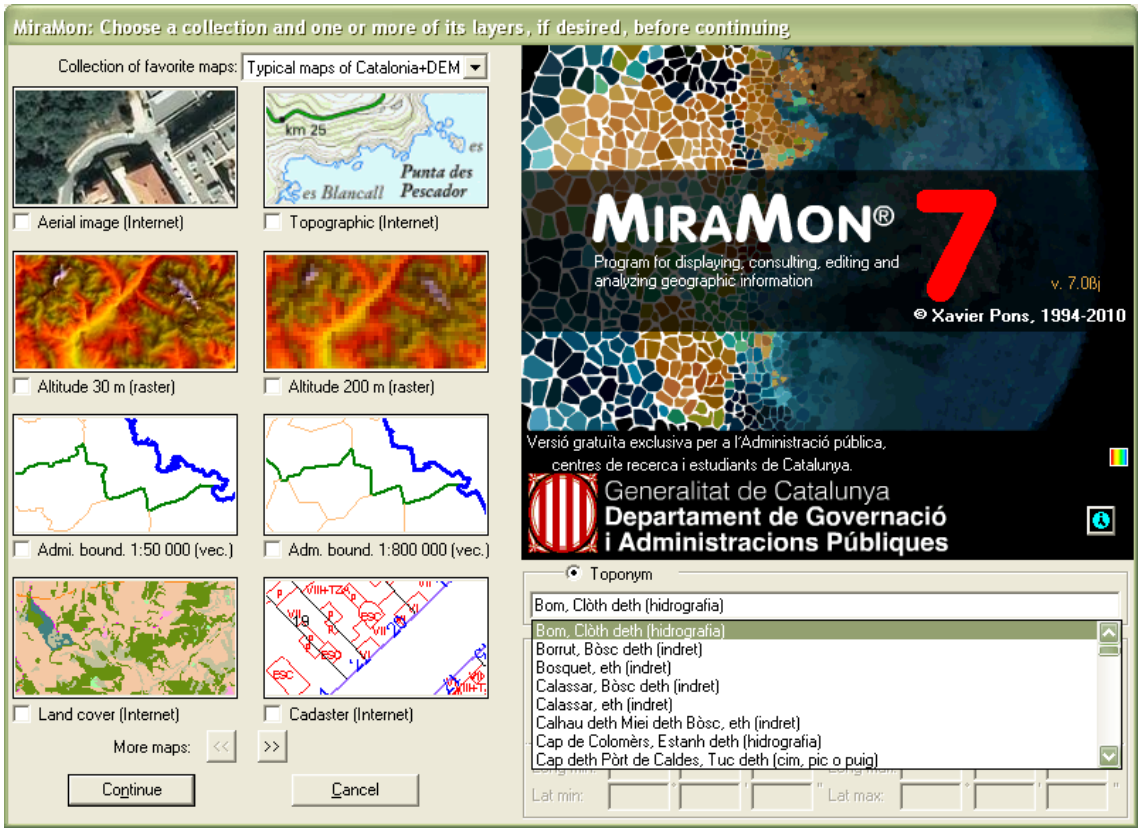
- Geographic fields (local ambit, less conventional divisions such as working communities form different countries, linguistic domains or boundaries of nations without states).
- Teaching fields (e.g. collections that exemplify different types of data models in GIS or starting material for some classes of spatial interpolation).
- Different disciplines or applications (e.g. Remote Sensing data sets of images)
- Etc.

2.2. Search by toponym or coordinate/ambit in the new program's homepage box and zoom

It has been implemented two optional features that allow users to place themselves in a certain place to start ***through a toponym or an ambit or coordinates;*** these two optional features appear at the bottom right of the presentation box when opening MiraMon. It can also be searched later by toponym from the new menu item ***"Zoom to toponym".***

2.2.1 Going to a particular location through a toponym

As discussed in the previous section, another improvement in MiraMon v.7 is to **facilitate the user to locate on the map from the beginning.** To this end, the homepage box also provides a easy location section.



2.2.1.1 General operation and use

To activate this option, as shown in the illustration above, simply select the "Toponym" option and write the place name or part of the text of the name you want to locate. The program will conduct a search within the ***dictionary of toponyms related to the collection we have chosen at the left side of the box,*** dictionary incorporated by default in the program since v.7, and will show us a list of all toponyms found containing the text written by the user. Then, select a text and click on continue, if a collection of favourite maps is selected, the ***program will set the display to the right place,*** showing it in a box, usually red, inside the view.

If you wish to use a different dictionary, you can choose it from the dropdown list.

2.2.1.2 Selection criteria of toponyms

To facilitate locate the user's desired toponym and to correct spelling errors or differences between the text written by the user and the toponym text in the database, the program performs an ***insensitive*** **search to case*, to accent or to other special characters,*** to build a list of all toponyms that contain the text specified by the user.

The list of the selected toponyms are shown in alphabetical order; ***prioritizing toponyms*** by starting text as specified by the user (maximum priority), by having any word that starts with the text specified by the user (medium priority) or just by containing the text in between (lowest priority). Thus, for example, "Cabrera" appears only as a third priority, if the user types "era" in the searching box.

If the number of toponyms found is very large (e.g. if you have written "can" (*)in Catalonia), the list shows only a subset of occurrences (now a hundred records, but MiraMon.par can be configured if needed) and in the last occurrence it writes that the result is not completed.

2.2.1.3 Dictionary of toponyms

The program includes a dictionary of toponyms of general interest for each collection. As explained earlier, each map collection can have its own dictionary of toponyms, stated in the appropriate field of the table of a collection (of course, different topic collections of Catalonia can share the same dictionary of toponyms). However, if you have other toponym lists, these can be included in ***u_topon.ini*** file*,* properly indexed as indicated later. MiraMon searches this file in its directory, but to facilitate the coexistence of shared and not shared dictionaries, the list will only show those with reading access.

Each dictionary of toponyms is a set of DBF files with a certain structure and order. At least, there must be a DBF file that contains toponym texts along with their location and a file, also in DBF format, which contains the toponyms indexed by different criteria.

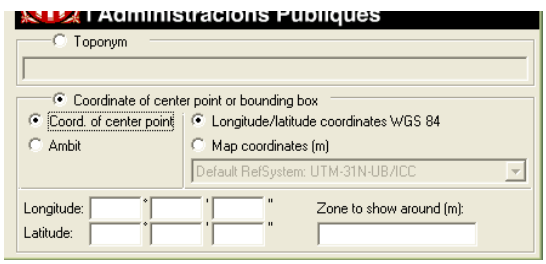
If the user has a list of toponyms, it is possible to add it to the dictionaries supplied by default; to that effect, toponyms just need to be geographically connected through coordinates and to generate an indexed table through "DiccTop.exe" program, which may be requested to suport@miramon.uab.cat .

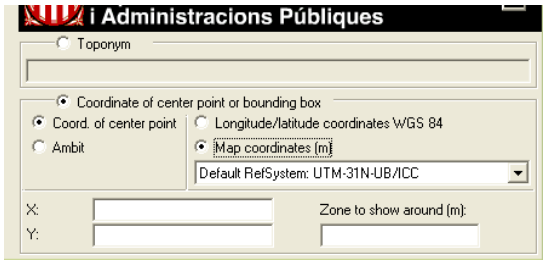
Note that a single dictionary of toponyms can be used (targeted) for more than one collection (e.g. the same dictionary of toponyms in Catalonia can be used in a collection of geophysical data of the country).

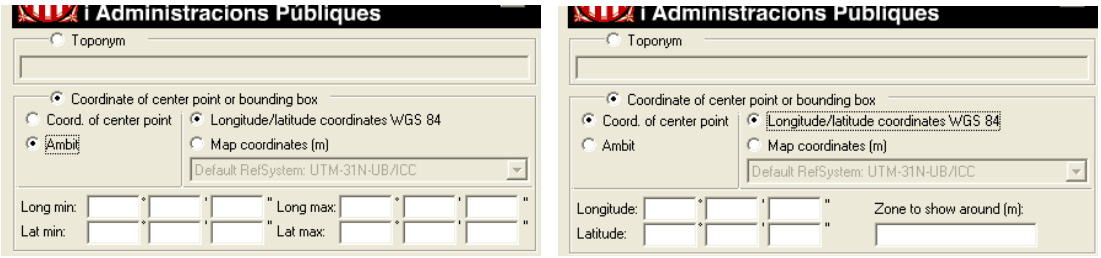
Distributed dictionaries of toponyms are a rich database that has been specially selected for each collection. Therefore, each collection contains tens of thousands of toponyms, which make the location of almost everywhere on the geographical ambit of that collection, easy and successful; obviously, the scale which is intended to use a collection determines the richness of toponyms per area unit; hence, in the global database one does not find certain toponyms that one can find in the case of the Catalonian database, the same way that the Catalonian database does not have very local toponyms, more typical of a county or municipal collection, for example. They have also been excluded from the distributed dictionaries, entries that have been considered minor entries, such as hotels, etc, as it required downloading very large files. The existence of these dictionaries with minor elements or with more local toponyms is therefore, reserved to use it in smaller areas collections, from the topic or scale point of view, or in the geoservices context to be mentioned timely.

2.2.2 Going to a particular site through a coordinate or a boundary box

To activate this option, as shown in the following illustration, we select the "***coordinate of center point or boundary box*** ". This enables several options that allow to indicate a center point coordinate and an additional ambit around this coordinate, which is always given in meters, or to indicate an ambit in any reference system. When clicking "Continue", if you have selected a map from favourite collections, the program will show the chosen site indicated by ambit using the center coordinate and an area around it, or directly as an ambit, depending on the choice made; the selection ambit is usually shown in a red box within the field of view.







In both options "Coord. of center point" or "Ambit", you can choose coordinates by longitude/latitude in WGS84 datum in degrees, minutes and seconds, or by map coordinates (X, Y) in the reference system mentioned using the dropdown list.

It is not necessary to indicate the coordinates on the same reference system than selected maps, the program makes an automatic transformation of the reference system coordinates of the map.

You can find more information on the ***ColleccionsPreferides_i_CercaPerToponims_vx*** document, available to public administrators, teachers and users in general by requesting it to suport@miramon.uab.cat .

2.3. New entries and other changes to the menu

The **File** menu has been simplified and restructured following the next scheme:

- ***Open favourites...*** *(the new button*  allows *accessing to the box of favourites maps from the button bar)*
- ***Open...*** *(to open maps, rasters, vectors, etc and also to send no graphics files to other modules: REL to GeMM, tables to MiraDades or to layers according to choice, etc; on the other hand, the classic button*  *from the button bar is no longer limited to just opening maps, but it leads to this option and therefore the navigation on all disk resources that MiraMon can manage)*
- ***Open map...***
- ***Open raster →***
  - *Open raster ...*
  - *Open RGB -> 8- bit ...*
  - *Open RGB -> 24- bit ...*
- ***Opening vector →***
  - *Open structured vector ...*
  - *Open non-structured vector ...*
  - *Open points in table or layer in Spatial Database Source..*
- ***Open Internet resources →***
  - *Open Internet MMZ ...*
  - *Navigate among OGC servers (WMTS, WMS, etc) ...*
  - *Open ECWP or ArcSDE layer...*
  - *Open KML from Internet...*

- ***Close...*** *(It allows you to close any kind of open resources, which in turn, can be filtered according to typology: maps, rasters, series, multiseries, etc.)*

- ***Save map...***
- ***Save raster / WMS as raster...***
- ***Internet/Intranet map publishing…***
    - *Create an MMZ ...*
    - *Create an HTML map*
    - *Administrate an OGC client or server (WMTS, WMS, etc) ...*
    - *Create a WMTS / WMS zoom level ...*
    - *Create a KML (Google Earth) ...*

New developed applications have been incorporated to the menu, such as ***importing files*** (located in the "File | Import", files such as ***KML***, ***HDF, GML*** or ***ArcSDE geodatabases***) and / or ***exporting files*** ("File | Export", files such as ***GML or SHP***), analysis of ***distances and routes*** ("Analysis of ***minimum cost of travel***"), connecting with GPS via ***GPX*** ("Tools | GPS | Import from GPX (GPS eXange Format) to MiraMon ", etc).

It has also been incorporated in the menu the new entry ***"Open other Internet maps and layers"*** that allows you to open WMS layers not available on Internet, as ECW files accessible via ***ecwp://*** protocol and ArcSDE geodatabases. In the near future, it is expected to add a list of all MiraMon maps distributed via Internet (MMZ) in a new interface of advanced search which details are given later in the chapter.

The menu with more incorporation of new modules has been Tools menu, with new remote sensing computing tools to calculate ***emissivity, apparent brightness temperature,*** generation of graphic ***histograms*** of frequencies etc. It has also been added new tools such as the ***Contour line interpolation*** from a Digital Terrain Model (DTM), facilitation in the geometric correction of images by an ***automatic search of control points,*** generation of ***3D views,*** etc.

Some menu entries have changed a bit its wording to adapt them to a widen functionality or to better clarify the task they perform. For example, "***Open points in table or layer in Spatial Database Source***", in addition to opening a REL layer, it now allows to open a SDS file with access to information contained in ArcSDE servers.

Information on most of these new additions is given in the following pages.

2.4. News to the Zoom

A ***new zoom scheme*** has been incorporated in the Whole View mode that exceeds the 16 levels of previous versions and provides **30** levels instead. This allows you to scope from the whole world view to strongly submetrical details,

many more details than most browser environments of Internet cartography have and very useful on local scales and when vector editing. This broadening also allows to avoid the annoying jump when increasing the zoom and switching to a new cycle of zooms.

This change has led to the reprogramming ***of 64 bit arithmetic*** zoom management. Raster mode of zoom management has the same 16 traditional level and one additional level (/1000) for especially large rasters.

It has been abandoned the criterion of jumping two zoom levels when Zoom + or Zoom - when raster. Now, therefore, increasing or decreasing moves a single step the zoom level.

In addition, when managing de zoom in the Raster mode, zooms + and - are no longer done from the center of the screen but from the pixel angle in the upper left corner, if possible (i.e. except when the size of the raster with respect to the new zoom level allows it: when there's no need to refocus it). This allows, in the raster mode, to view a certain pixel with total precision at different zoom levels simply by placing it in the upper left of the client area. The zoom to selected, however, continues placing the selected area in the center of the screen.

Another substantial improvement is that, in the Whole View mode, when asking a "Zoom +" or "Zoom -" through the keyboard or the mouse wheel, in the new view ***the mouse arrow remains in the same spot of the map it was before.*** However, if the zoom increase or decrease is done manually by moving the slider button on the zoom bar, via menu or by pressing the buttons "Magnifying glass +" or "Magnifying Glass -" on the toolbar, the new view is from the center of the scene. Remember that, as mentioned earlier, in raster mode zooms are all from the upper left pixel of the screen to have maximum control of their position.

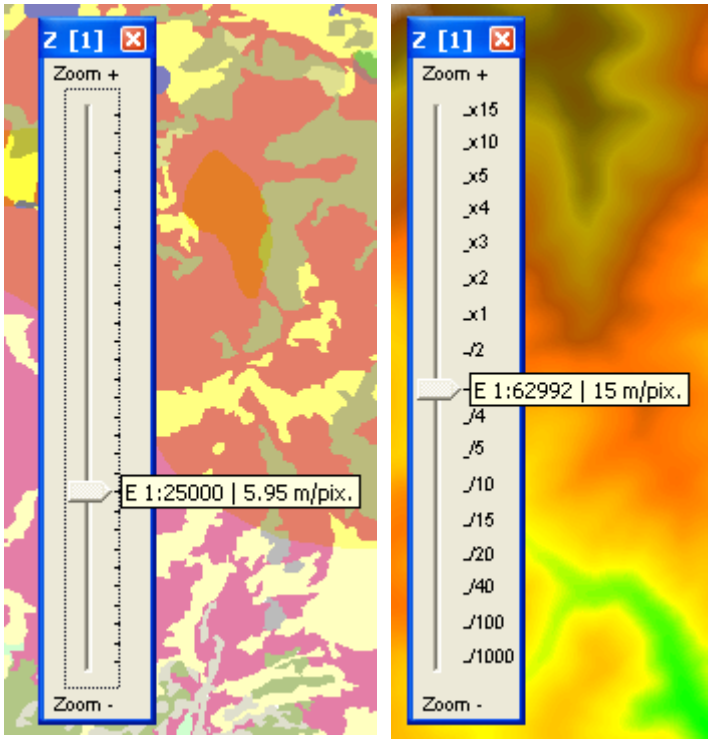
It is provided bellow some additional details of this notable improvement in the zoom management:

- Levels x1, x2, x3 and /2 /3, etc from the classic Zoom menu become a "***Zoom level in Raster mode"*** submenu***.*** It also ***reverses the layout of the levels*** to follow the criteria that is being predominant in the applications, where the most extended zooms are placed over the top of the dropdown menu and at the top of the zoom bar. This menu disappears when working in the Whole View mode.
- It expands to 30 the number of levels of zoom management mode when the zoom is working in the "Whole View" mode, they are placed in a new "Zoom | ***Zoom level in Whole view mode"*** submenu***.*** This menu disappears when working in the Raster mode. With the new number of level from the Whole View mode, MiraMon screen can contain information from the whole world to information to less than a decimetre (which means ***inverse scales,*** where ***the map is enlarged with respect to reality).*** This prevents the change on the cycle of zoom that occurred when increasing the zoom level. Similarly, for very extreme cases (where the pixel screen size is equivalent to less than a micrometer on the

ground), the program can work on a new series of zoom, but it is only necessary in very special situations of vector editing.

- A ***zoom bar*** is created in the form of floating box to facilitate zoom levels switching. The box can be activated or deactivated from the menu "View | Environment" and from the "Zoom" menu itself. The default state of the new bar (visible or not) can be managed from ShowZoomBar= of the MiraMon.par file($). In any case, the zoom bar is hidden automatically when there is no set of geographic information loaded. The zoom bar has a title that indicates, through the corresponding number, which MiraMon session it belongs to, very useful if we have more that one session opened and, when managing zoom in the Raster mode, showing levels x1, x2, etc for precise display control. ***The resource responds to the wheels of most mice*** so that spinning the wheel "forward" the level of zoom increases and vice versa.

  In ***addition, when moving the zoom button on the toolbar, it appears information balloons with the scale and the pixel size representation on the screen, always in field units.*** Even more, field units indication is given in multiples and submultiples of m (e.g., 40 km/pixel in a Whole view of the world and on a screen of 1024 pixels, 50 cm/pixel, etc), whether Horizontal Reference System is in meters and latitude-longitude systems is in degrees (in cases where reference system units are unknown, the original units are kept). If one wants to know the screen pixel size in the original units and with more decimal places, click on the scale bar in the status bar.



Zoom bar in the Whole View mode (left) and in the Reference Raster mode (right)

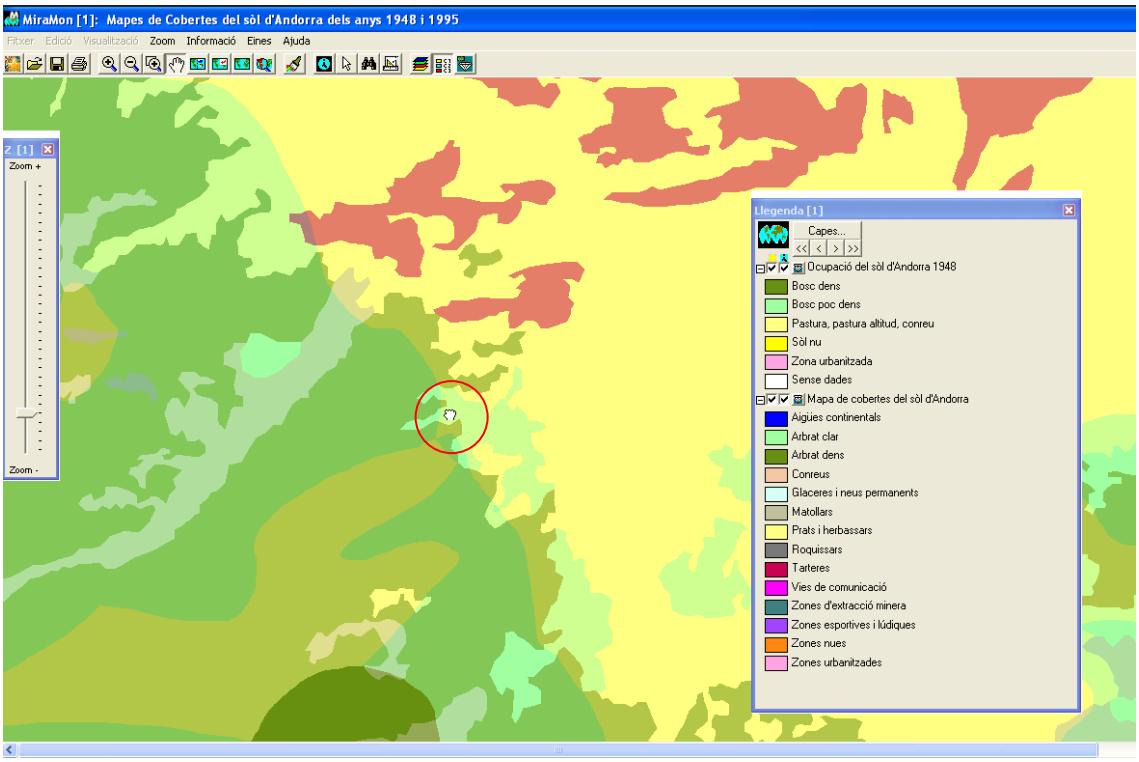
2.5. Update on the lateral displacement ("pan")

The program ***automatically switches to move the map by dragging the mouse*** (as if the hand button or "pan" was pressed or as if this feature was requested from the "Zoom" menu) when it detects that, after clicking with the right button (or left, if you are left handed and therefore you have swapped the mouse buttons), an immediate dragging occurs. Then you can release the button and work in the traditional MiraMon mode, displacement continues until there is a second click.

The lateral movement dynamically enabled via dragging the mouse, ***automatically go back to query mode when a second click of displacement is done.*** After all, to keep moving is as easy as dragging again. In caring for people with difficulties to keep the dragging button (people with Parkinson's, etc), the automatic return to query mode is not effective when it has been requested from the menu or from the corresponding button on the button bar. In which case, "pan" mode is activated until you change the zoom level; it explicitly deactivates via the buttons bar or from the menu or by clicking “back" on your keyboard.

Users may have mice with different sensitivities, faster/slower computers, etc that may cause problems when working with this new feature. To avoid problems, it has been added to the [HARDWARE] section of the MiraMon.par the new TempsArrossegamentDinamicSegons= parameter, which ***allows to indicate the time*** **in seconds,** ***that the program waits between a mouse click and a drag to consider that a dynamic change to displacement mode is done (“pan”).*** It can also be inactivated the dynamic change to movement with the same parameter.

Additionally, if you want to ***activate or inactivate the dynamic dragging mode when digitizing,*** another new parameter from the same section [HARDWARE] can be used, ActivaArrossegamentDinamicDurantDigitalitzacio=; this parameter is useful for some people that tend to "drag" the mouse between clicks during digitization and activate too frequently the dynamic drag.



2.6. Redrawing

The functionality that ***"interrupts the redrawing when the Shift button is pressed (arrow ⇧)"*** has been now broadened to ***interrupt the WMS layer redrawing*** and also to the ***redrawing of vector objects (structured or not).*** Becoming useful when a WMS layer or vector is very slow to redraw and there is an open raster in the background that can serve as a reference, therefore we do not wish to turn the WMS layer off while looking for an area of interest.

Moreover, it has been added to the ***"View | Special"*** menu ***the new "Interrupt the redraw selection with Shift" option,*** which allows to avoid drawing selections (raster or vector), which is useful when we want to accelerate the drawing when moving, making zoom, etc. In previous versions this functionality was linked to the option to interrupt the drawing of vectors and WMS layers with the shift key (previous paragraph), but the new option helps to prevent the drawing of vectors and, instead, draw the selections or, in the opposite, avoid drawing selections but allowing to draw vectors and WMS layers.

2.7. Faster opening of IMG rasters and RGB composites

It has been made that both the IMG files and RGB composites can be opened without loading them into memory nor creating a temporary preview file, i.e. in a dynamical way for each zoom, scroll, etc, from the original files. This strategy, which had already been successfully implemented for other rasters formats supported, brings two advantages:

1. An almost immediate opening of any file (except not indexed RLE, as discussed later), with great independence to their size and complexity.

2. Non limitation on the number of rasters opened simultaneously, as happened before, due to the exhausting of the computer memory.

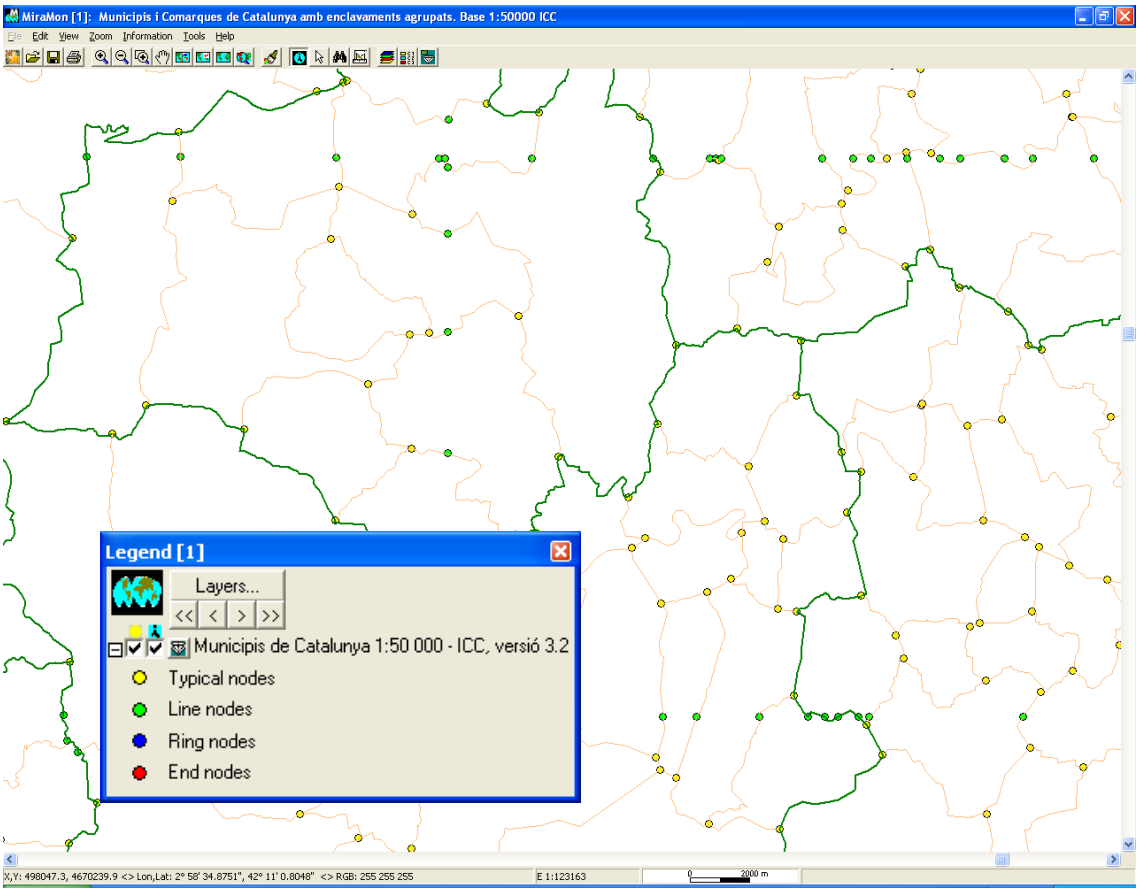
However, if your computer has enough memory, the classic loading mode on memory (which consumes as much RAM memory as the full image in byte format (or 3 * byte in RGB composites) while the raster is opened) or preparation mode on disk (which consumes temporal disk space while the raster remains opened) provide ***redrawing*** (not the first view!) a little faster, especially in broad zooms (in detailed zooms the time differences are almost imperceptible); the reason for not matching the speed is obvious: when it is prepared in memory (or on disk) the exactly format required by the Windows graphic system, visualization is faster than reading it from 1 file (or 3 different files in an RGB composites), combining its pixels in a BIP format and eventually scaling and optimizing its values, understanding the compression when the file had been compressed, considering NODATA values, etc. However, in uncompressed files the speed of drawing is very comparable, being in compressed files where is more visible the effort to be made for drawing each one. We must also remember that if the raster or rasters to be opened are located in units of slow access (external disks, especially USB-1, low speed network drives) the new mode can yield to substantially lower performance, as in each redrawing it needs to access to the original data.

The new mode is also available for *long* or *integer* rasters type associated to a legend (i.e., rasters of more than 256 categories). If it is a not indexed RLE raster (information available on the GeMM Thematic Information tab) the first reading is also faster than loading the file into memory or putting it on disk, but much slower than indexed, due to the way of mounting indexation (if you do not wish to have to wait every time you open the file, you must index it using the IMGIMG module, located in the menu "Tools | File maintenance | Raster conversion and compression / decompression"). Anyway, the new option, although somewhat slower than the classical option in successive redrawing, allows additional benefits such as quickly opening and minimal memory consumption already mentioned: in the case of an RGB, image optimization is almost immediate, after the first image optimization has been made and the histograms are calculated (while in the classic mode each optimization parameters trial(*) requires refresh all rasters in memory), so it is very useful when undertaking test on which optimization parameters are more suitable for a certain image.

2.8. Legend

Visualization features and legend features from no IMG raster files can be read or written**,** which facilitates the design of maps with rasters in BMP format, etc.

The ***node layers now permit showing different types of ordered symbols in the legend,*** as can be seen in the following illustration. This makes it easier to understand vector topology, to correct vector digitization errors, etc.



It is now allowed to ***open metadata from the legend in files where previously was not possible,*** like BMP, etc. To this effect, you can use the metadata button in the legend  , in addition to doing it from the box "Modify layer order and properties…" and from the box " Information | Opened raster". We have also improved the title of the legend in the case of 8 bit BMP when REL is not available.

2.9. Corporate management of MiraMon.par

As many users know, MiraMon has a general configuration tool encapsulated in a file. This file is called the MiraMon.par and is located in the working directory of the program (which is designed through the Windows tools to assign the properties of each program or through the parameter "/DT =" from the command line) or in the MiraMon directory; this file is accessible from "Help | Configure parameters" menu of the MM32.

Until now, the use of this file has been enough for individual users and corporations that defined a common profile for all users. However, the fact that MiraMon is used in larger organizations and with more diverse users, has made necessary to offer the ***possibility of custom configurations (profiles) in a same corporate environment.***

If you are a MiraMon user in individual versions, not integrated into an institution in which multiple users share the program and its configuration (as a public

corporation, or a university), this section is probably not of your interest and you can skip to the next section.

The motivation for enabling optional MiraMon configuration settings for corporations is due to the need to use MiraMon centrally, i.e., a need to configure unified MiraMon parameters. As we have said so far, to configure MiraMon it was needed to change *MiraMon.par,* located locally on the user's computer, despite the executable was being used in a server. There are different reasons for a centralized configuration. For example, if a user group has larger screens, there is a need to change the specification of the screen dimensions quickly and easily (not having to go to each user MiraMon.par individually) editing one file for the whole group and thus, all users will see with total accuracy the scale of the maps shown on their screens. Similarly, other examples are to change the variable that allow to keep vectors in memory when a user group is reading the files remotely through a low speed network because they are in another building, setting MiraMon menu to appear more or less options depending on the user (reader/complete), etc…

From the user's point of view, the corporate MiraMon.par new operations follow the following rules:

- When opening MiraMon, it checks whether in the command line is indicated to use a specific MiraMon.par. If so, this will be used. Otherwise, MiraMon.par will be used as reference from the directory of the MiraMon corresponding executable.
- When opening MiraMon.par, it reads weather it requires to follow a corporate setting scheme (distributed), or if it simply uses the MiraMon.par configuration (typical case of individual users, and when it is not necessary to define different profiles for different users). In the second case, none of the following points can be applied.
- When MiraMon.par requires following a corporate scheme, it detects which user is logged on the computer.
- It will check that this user is in the corporate MiraMon.par user's list.
- When the user is in a corporate MiraMon.par group, MiraMon will initiate with their specific configuration.
- Otherwise, the user will be informed that the user is not in the corporate MiraMon.par and to contact the system administrator. However, the user can continue with an administrator default configuration. MiraMon writes in a specific file the name of that user, so administrators can know the existence of users not assigned to any group or profile.

From a more technical point of view, the presence of the "cfg_corporativa=" key in a MiraMon.par file, indicates that rules, lists of groups, etc must be applied.This information is collected in DBF tables with information on the usernames, their groups, and different MiraMon.par files that may be general parameters of the whole institution, parameters of a certain group and even parameters of a certain user (naturally, the latter only applies to users with special needs, not listed in their own group). Note that, as mentioned, it can be specified, what menu options each user can view.

For detailed information on how to implement a corporate configuration of MiraMon initialization parameters, you can request the "Management of MiraMon.par_vx" document at the following email address: suport@miramon.uab.cat .

2.10. Other corporate improvements

It has been defined a ***new user profile file,*** not in terms of setting (which is resolved from individual MiraMon.par or corporate MiraMon.par mentioned before), but in terms of the last Internet resource opened (WMS, WMTS, etc) or the last collection of favourite maps which has been used, all with the aim to facilitate the use of the program when opening a new session and perhaps it is desired to access again to resources previously used. This file is called MM_Profile_USUARI.par (where USUARI is the system username) and is located in the temporary directory (including the username in the file name responds to the fact that some classroom settings use the same temporary directory for all users of the same computer).

Note that in the case of open resources through ***Windows exploration box*** (IMG files, POL files, etc) a following up of the user's profile is not done because Windows does it itself: being an exploration box, note that the resource where you can type the file name is also a drop down resource; if you press the right arrow, the last accessed resources will appear and they can be reselected.

2.11. Languages

MiraMon is offered in three languages as it has been done traditionally. Note that applications and the MM32 can be initiated in a certain language indicating /LANGUAGE = and typing the specific language code: CAT, SPA, ENG.

3. Improvements and/or innovations in data types

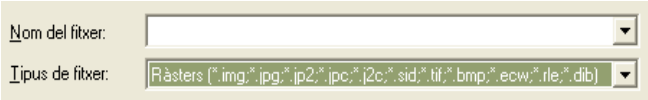
3.1 Rasters

Raster types that can be opened directly and some peculiarities:

The new JPEG indexed format of MiraMon has been successfully implemented; it allows JPEG mosaics in a single huge JPEG file (up to 4 Gbyte). Primarily used in Internet browsers but also in MM32. The main advantage is not having so many small files, as well as not having the problem of JPEG format, which cannot read a specific area without uncompressing the whole file.

Directly, either from the menu ***"File | Open…"*** or ***"File | Open raster…", dragging them*** on the application *(drag & drop),* ***double-clicking the*** Explorer ***file*** or ***activating them from the command line*** (MM32 [path]NOMFITXER.EXT), or ***linking them as hyperlinks to databases*** and opening them from the location query boxes: the list of rasters that MiraMon can traditionally open directly has been extended to:

***.img; *.jpg; *.jp2; *.jpc; *.j2c; *.sid; *.tif; *.ecw; *.bmp; *.rle; *.dib;**



As for ***georeferencing,*** support has been implemented for: JP2+ J2W, J2C+JCW, SID+SDW, beside TIF+TFW or TIFW and JPG+JGW or JPGW, etc, which was already implemented. Thus, if one of these files (JP2, etc) does not have a REL it attempts to read the coordinates of the appropriate *"world"* file and, if any, it also loads the Horizontal Reference System indicated by default in the MiraMon.par. Along the same line, it has also been expanded the list of recognized horizontal reference systems to ECW raster format and in UTM-30N ETRS89 datum system, both when importing and direct reading.

On the other hand, and given that BMP files can now have metadata (like other formats), and with them, georeferencing, it has been promoted to open BMP files as any other raster format of direct visualization. Note that ***24-bit BMP format*** in particular is especially suitable for users who have colour rasters of 24-bit (3 RGB bands, as many colour orthophotos), who wish to work ***with lossless compression techniques*** (classic JPEG type, JPEG2000, SID or ECW), and who wishes a ***higher speed of visualization,*** since among the 24-bit formats Windows display the BMP format quicker by default. Thus, it is possible to have for example 1 Gbyte files, and have them on screen in an instant.

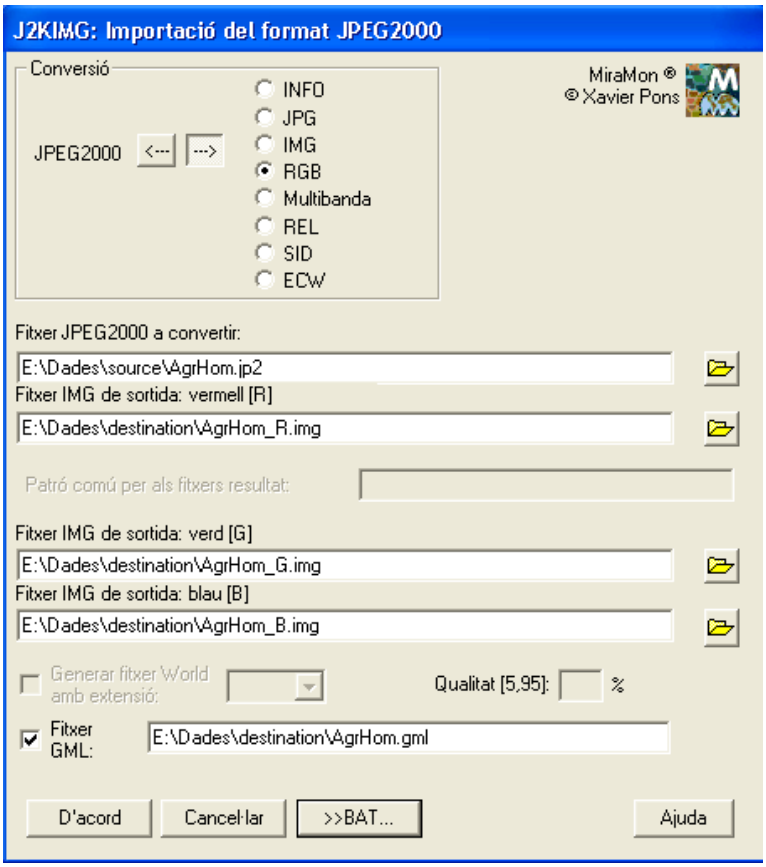
The "File | Save as IMG / JPEG ..." has been renamed to "File | ***Save raster/WMS as raster ..."*** and it also allows saving an open WMS view as a raster file with ***resolution to the user's will.*** In addition, it allows you to save an open raster in the format of ***JPEG2000, SID or ECW as a BMP georeferenced file.*** In the case of Internet layers following the protocol ecwp://, it acts as in ***WMS:*** it is offered to save the current view in the resolution that the user wishes. For ***ECW,*** it is asked the desired pixel size and the current window is saved in BMP format instead of trying to save all the ECW to the highest resolution; in this sense, test have been done on accessing 24 bits of colour ECW files throughout the Iberian Peninsula at 2.5 m resolution and ECW size near to 10 Gbyte in order to extract, for example, Catalonia and the surrounding areas at 20 m resolution, generating successfully 24 bit colour BMP files and with a size of 760 MByte.

New types of rasters that can be opened through import:

Through import, from the "File | ***Import*** ' menu:

- A special effort has been made to import popular formats in the distribution of ***Remote* Sensing** raster information, such as the ***HDF,*** due to the diversity of existing subformats depending on platform and sensor ***(ASTER, MODIS, NASA Ocean [SeaWiFS, CTS, CZCS], PrOBA-CHRIS,*** ...), or formats being increasingly used that should commonly be

imported to other working formats, such as ***JPEG2000,*** which allows direct reading of the conversion to IMG, JPG, RGB etc.



- Apart from this, and regarding import modules of raster data, we want to emphasize that on going improvements on creating, completing and consolidating the various applications for reading raster data are being undertaken, including remote sensing formats, such as CEOSIMG (from ESA), NDF (NLAPS Date Format, from USGS), SPOT-DIMAP (XML), QuikScat, AMSR-E (Aqua satellite), etc, with particular attention to the recovery of metadata.

Image enhancement

It is allowed ***image enhancement on any of the open rasters where it is applied (IMG and 24 bit IMG).*** The option "Restore original" from the menu disappears and becomes a button of the optimization box. Within the same box, the display of any open raster can be governed and the enhancement can be applied without having to close the box. This allows a fine enhancement of images. Moreover, progress has been achieved on some cases where enhancement was applied to images with NODATA values where a "special" colour (yellow, transparent, etc) was manually assigned to the NODATA area, and when the original display was reset, and then the change in colour assigned to NODATA was lost. "Restore original" also activates strictly when image enhancement has been applied and not when a colour has been changed manually, which can be managed from the palette reloading.

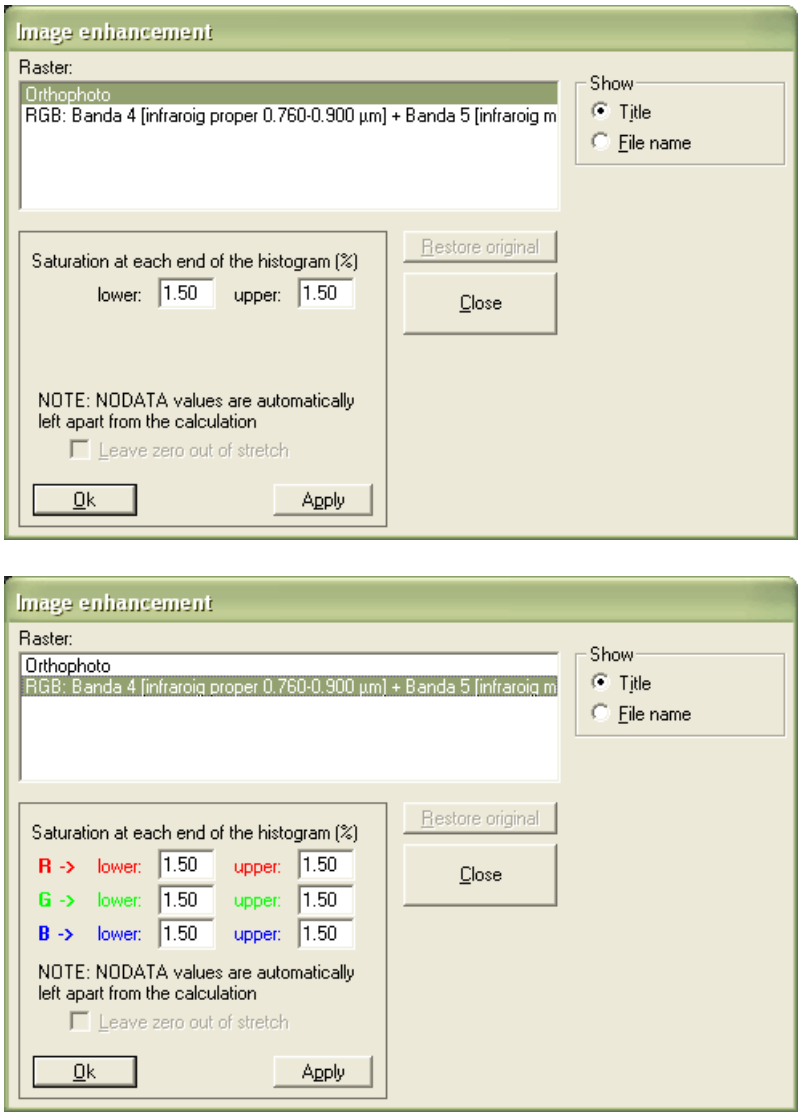


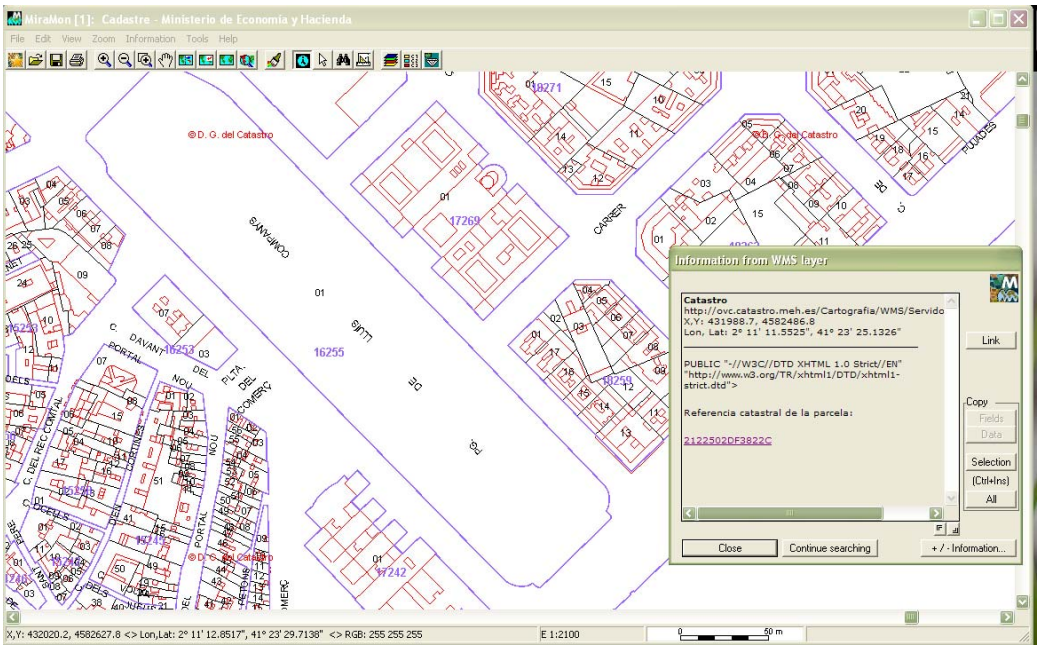
Image enhancement can also be applied now from the respective symbolizing boxes both as raster and as RGB composites.

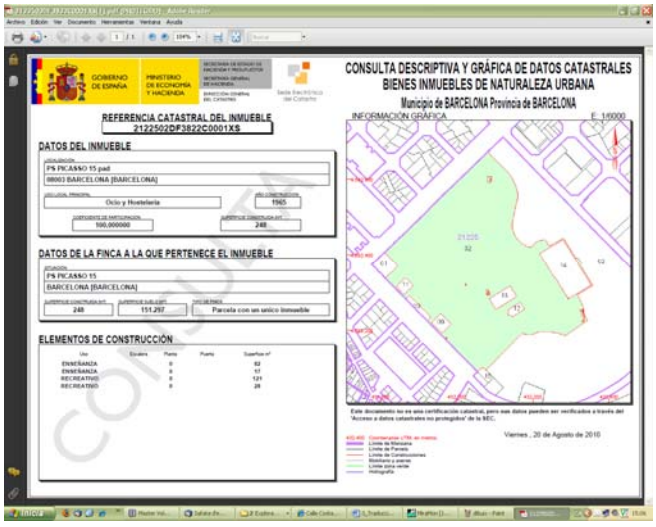
3.2 WMS layers

WMS stands for *Web Map Service,* a specification of the Open Geospatial Consortium (OGC) aimed at standardizing access to maps via browser systems based on Internet protocols *(Map Browser Systems).* A client (typically an Internet browser) with WMS navigation capabilities (via JavaScript, for example) may access mapping servers that follow the WMS specification, regardless of the cartography provider and the technology manufacturer.

MiraMon team keeps a constant WMS servers update with data that may be of interest to users. When pressing the **"Update server collection"** button while connected to the Internet, it will download the updated collection from the MiraMon *web*. There are currently dozens of servers available. The following screenshot shows a query on the cadastre server of the Spanish Ministry of

Economy and Finance which, in turn, allows opening a hyperlink to a cadastral information file.





As one can imagine, MiraMon team does not maintain an exhaustive list of WMS services, but it rather tries to gather the most interesting WMS servers for its users in the corresponding pull down option. For example, in the last months the new server of OrtoXpres maps of Catalonia of the ICC has been incorporated into the collection of WMS of MiraMon. Along this line, if you happen to know servers that you find especially relevant to the MiraMon catalogue, please write to contacte@miramon.uab.cat .

Improvements in the interpretation of WMS queries: Work has been done on the interpretation of the WMS response to the query on specific location of ESRI servers that provide a table in return.

Better speed on WMS draw management: It has been highly improved the speed of browsing WMS layers due to the fact that the application retains the elements to regenerate views geographically close to the current one, thus a small lateral shift does not need to request a complete new request to the server, but works from the information that already has in its possession or, at worst, it only asks for the new area away from the current scope which had not yet accessed.

Ability to save a WMS view as a raster: Metadata of WMS views saved has been enriched with the inclusion of a process that informs about the WMS request that the view generates.

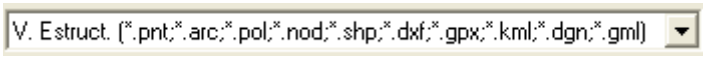
Suport a altres formats oferts:Support to other offered formats: It fully supports the direct reading of the new WMS servers based on indexed JPEG instead of the classic JPEG and IMG instead of GIF, which allows working with an amount of files hundreds of times smaller (and, therefore, the copy of WMS directories is now incredibly fast since there are fewer files). Since version 7 MiraMon gives full support to WMTS standard both in the Server/Map Browser as in the desktop version of the program.

3.3 Vectors

Types of vectors that can be directly opened

Directly, either from the "File | Open" or "***File | Open vector"*** menu***,*** dragging them on the application, double-clicking the file in the Explorer or activating them from the command line (MM32 [path]NOMFITXER.EXT): The list of vectors that MiraMon can traditionally open directly has been extended to:

***.pnt, *.arc, *.nod; *.pol; *.vec; *.shp; *.dxf; *.gpx; *.kml; *.dgn; *.gml**



As one can see, it supports ***direct-reading of KML files*** from Google Earth to MiraMon***, without having to import.*** Therefore, MiraMon accepts KML files with *Points, LineStrings and Polygons*, and with all three types of objects; in all cases, it creates a MiraMon Map file that opens all the content and where in the alphanumeric database there are the main attributes (name, description, entity identifier and style symbolization identifier) that the format considers. It is assumed the horizontal reference system in use (i.e. it turns from the internal format that we have loaded at the moment to MM32 or by default to MiraMon.par when no layers are loaded). ***KML*** files ***can be incorporated to MiraMon Maps (MMM and MMZ)*** by simply saving a map when a KML file has been opened, just as in the case of DXF, GPX, etc. It has also been incorporated to MiraMon menus ("File | ***Import*** '), the equivalent import application, KML_MM, so that it can perform bulk imports or, simply, to convert the layers to MiraMon format to allow changes in geometry, attributes, or symbolization.

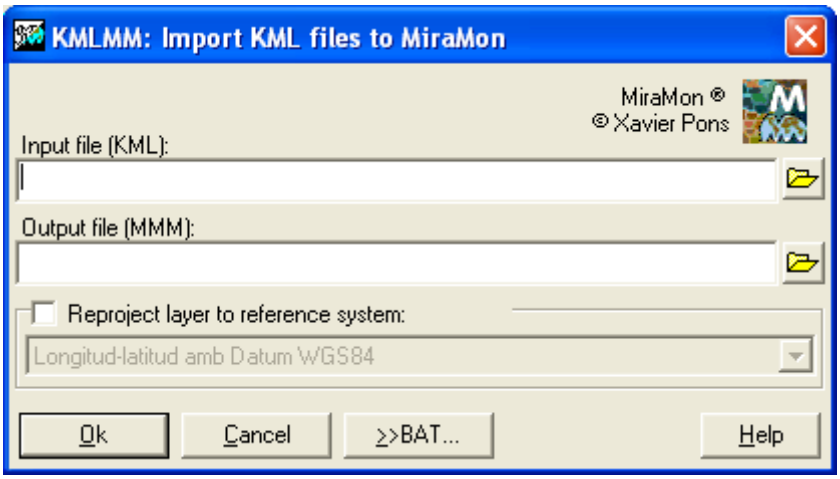
Along the same line, it supports ***direct-reading of GPX files, without having to import,*** typically from GPS receivers to MiraMon. GPX files with *waypoints*, *tracks* and with both types of objects are accepted, and in all cases it creates a MiraMon Map file that opens all content and has in the alphanumeric database the different attributes that the format includes. It is assumed the horizontal reference system in use. ***GPX files can be incorporated to MiraMon Maps*** (MMM and MMZ) by simply saving a map when a GPX file has been opened, just as in DXF case. It has also been incorporated to MiraMon menus ("File | ***Import"*** and "Tools | ***GPS"),*** from the equivalent import application, GPXMM, so that they can perform bulk imports, or simply to convert layers to MiraMon format and therefore to allow changes in geometry, attributes, or symbolization.

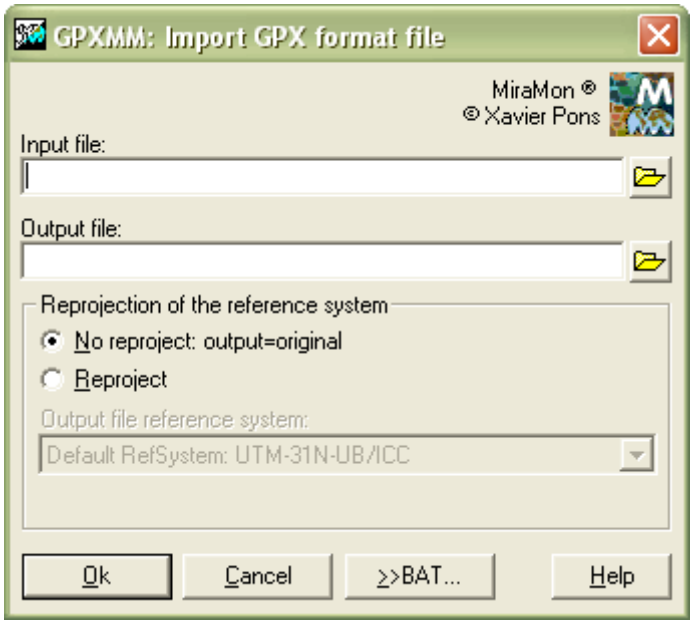
Finally, it supports ***direct-reading of GML*** *(Geographic Markup Language)* ***files, without having to import*** to MiraMon. GML files v3 and S-57 are already accepted, and soon it will also be supported GML 2. In all cases it creates a MiraMon Map that opens all content and has in the alphanumeric database the different attributes that the format includes. The appropriate horizontal reference system is assigned or, failing this, the system in use. ***GML files can be incorporated to MiraMon Maps*** (MMM and MMZ) by simply saving a Map when a GPX file has been opened, just as in the case of DXF, etc. It has also been incorporated to MiraMon menus ("File | ***Import"*** and "File | ***Export"),*** the equivalent import and export application of GMLMM, so that they can perform bulk imports and exports, or simply to convert layers to MiraMon format and therefore to allow changes in geometry, attributes, or symbolization.

New types of vectors that can be opened through import

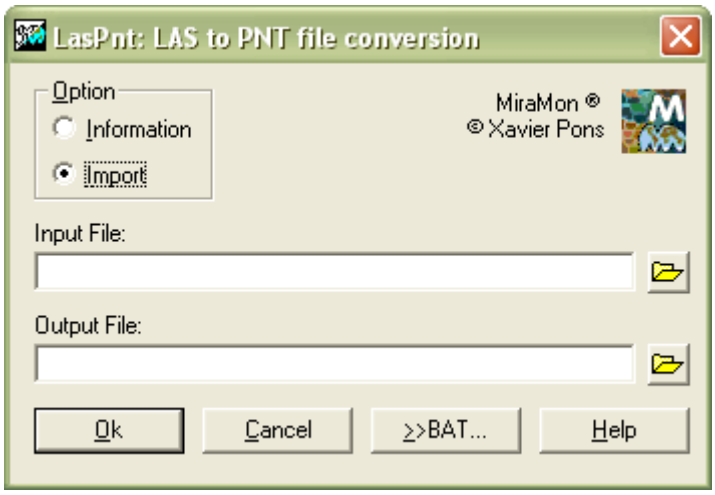
Through import, from the "File | ***Import*** ' menu:

- New formats of vector information distribution, such as **GPX,** very popular in many GPS environments, (and, as mentioned earlier that also supports direct-reading), **KML** (popularized by Google environments and that also supports direct-reading) or **GML (types 2, 3 and S-57).**



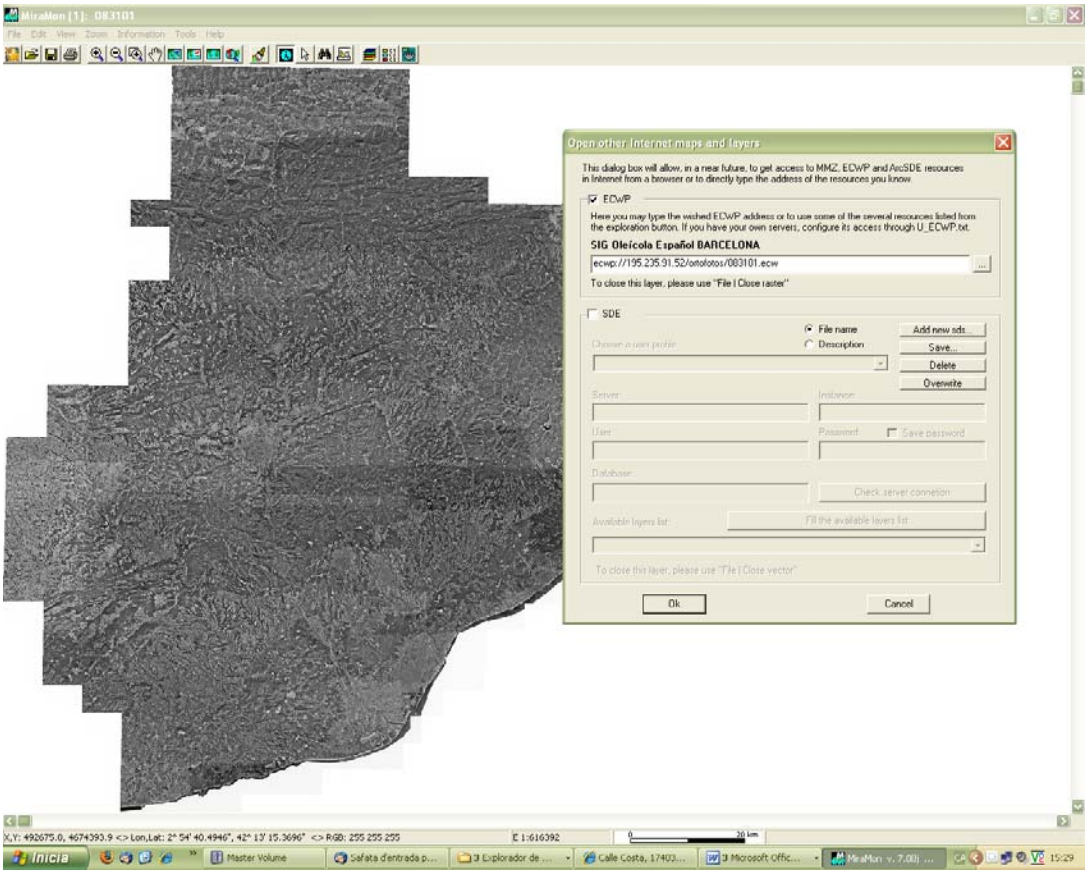


- Bulk distribution formats of specific data collected from Remote Sensing lasers and which is increasingly distributed in LAS format files. Therefore, LASPNT can read different Lidar data types in LAS format and conveniently transform them into a PNT format with attributes collected during the capture of laser points. Additional details regarding this application are given in the corresponding section.

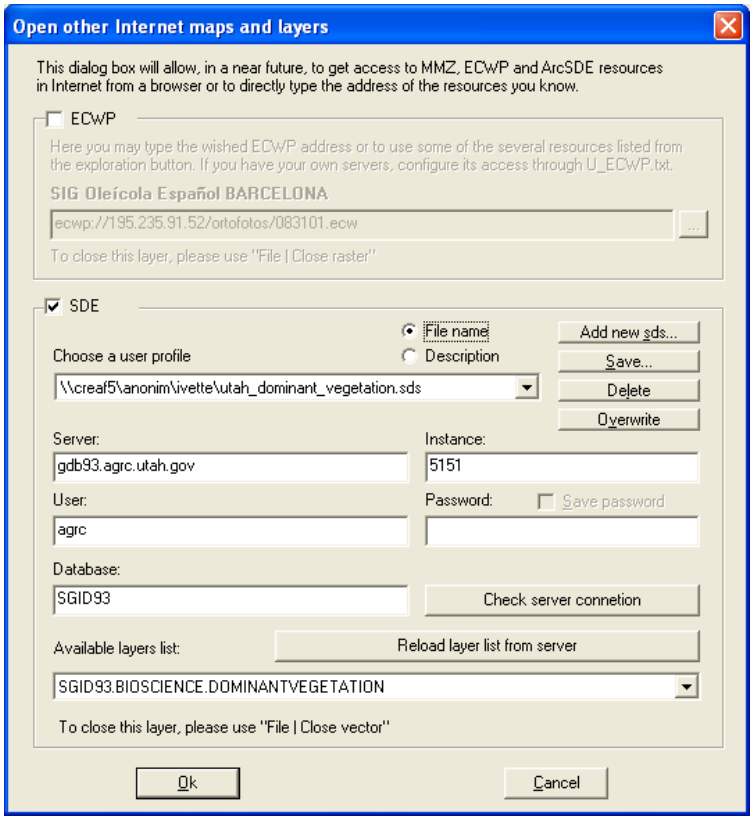


3.4 Access to other Internet maps and layers

This line, that has access from the menu via "File | ***Open Internet resources*** | ***Open other Internet maps and layers…",*** has been intensified in two directions. On the one hand, MiraMon uses ***ecwp://*** protocol to provide ECW layers available from the Internet. Apart from the different administrative units included in the "SIG Oleícola" in Spain, it incorporates other resources as the "Urban Planning Viewer" from Madrid, with 20 cm pixel size, etc.



On the other hand, there is now the possibility of ***direct-reading of resources from ArcSDE geodatabases from ESRI,*** as seen in the following screenshot.



3.5 **MiraMon Maps (MMM and MMZ)**

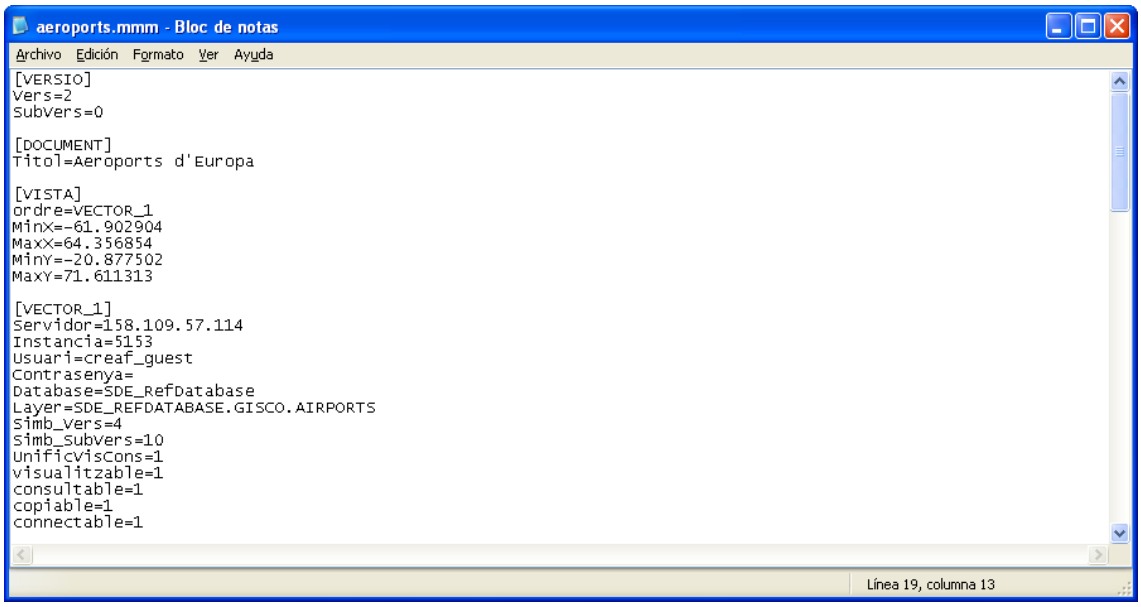
MiraMon Maps, due to the fact that they started to have a version in the early v.6, and that starts with version 2.0 of the map document, can now reflect:

- The possibility **of accommodating more than one raster, and of various formats such as IMG, RGB combinations, BMP, JPEG, TIFF,** etc, as well as other vector formats **(SHP,** etc).
- The property of **overlapping layers in any order** regardless of whether they are raster, **WMS** or vector (clau Ordre =).
- The ability to store the access to **ArcSDE** servers with their layers and views via IP.
- The possibility of incorporating new key ***"IdxBanda="*** in [RASTER_ #] map sections, useful to indicate, in cases such as multiband JPEG2000 where a particular band is opened in greyscale, which is the band that needs to be opened when loading the map. The reference to the band within the multiband file is done from an index between 0 and nbands-1.
- The possibility of ***giving names*** **to the sections** (i.e. [VECTOR_COMARQUES], which are inherited when saving new maps.
- The ***application position on the screen when opening the map.***

The possibility of supporting file references of virtually any type, in MMM has been ***extended to compressed Maps (MMZ),*** which can then compress and automatically include files of varied formats that refer to the corresponding MMM.

In the case of map compressing into MMZ files, it successfully supports the ***inclusion of accessory files (world files, etc) in formats such as SHP files, JPEG files and JPEG2000 files, TIFF files,*** etc.

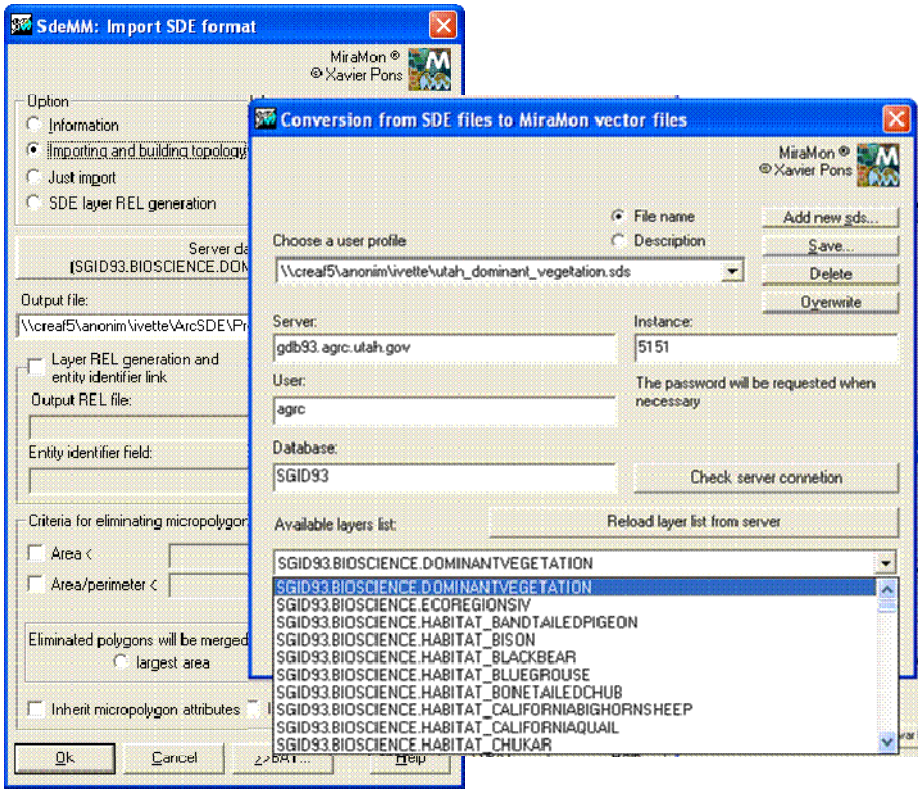
The specification of the ArcSDE layers is done the same way as for vectors, but indicating the server and other access parameters, as it can be seen in the illustration attached.



3.6 Databases

Access to ArcSDE geodatabases

SDEMM application has been developed in order to ***import*** ArcSDE layers of ESRI to MiraMon, converting them into its topological formats (PNT, ARC/NOD, POL) as well as ***having a direct opening*** from MiraMon. The attributes of objects from the ArcSDE layer become object attributes from the main table of MiraMon files. The process preserves the multiplicity of objects ***generating multiple records if necessary*** and it also ***incorporates information about each vertex of Z,*** if there is.



When direct opening occurs, the program performs a simple import of the format, without any additional modification of the geometry or topology of graphical entities, thus accelerating this process. In contrast, when importing layers from ArcSDE to MiraMon, the user can save the generated layers and decide if they have to be topologically structured or not, or simply display information about the ArcSDE database contents, etc.

In the "Server Data" button in the dialog window, the topic of the profiles has been improved by redoing it completely. ***Now each profile is a reflection of an SDS (Spatial Database Source) file extension.*** This SDS contains the necessary data to access the server where the layer to be removed is, as well as the list of layers from the last connection, all shown in the window without having to access the server; it also considers the possibility of refreshing by connecting to the server; thus avoiding having to wait the first time you connect.

Profiles can be viewed by "Description" or by "file name (*.sds). The list of profiles are stored in the file "U_SDE.ini" (which in fact is a list of SDS files with the profile enabled by default, if any, since ECWP option might be enabled and therefore, no profile would be active). 4 buttons have been incorporated to control these profiles:

1. ***“Add New SDS ... ",*** which adds data from an SDS file as a regular profile and displays it on screen.
2. ***"Save ..."*** which saves current data that is being displayed into an SDS indicated by the user.
3. ***"Delete"*** which removes a profile (but not the SDS file, since it must be done manually, in case other profiles use that same SDS).
4. ***"Overwrite",*** which overwrites the file with the new SDS information.

As mentioned earlier, SDS format is structured as an INI file with a section "SDE"; the different keys identifying an ArcSDE layer are: "Server", "Instance", "User", "Password", "SavePassword", "Database "(if applicable), "Layer", and a list of layer "Layer1 ",..., "LayerN”.

Because it is important to maintain a ***link with SDE objects***, it has been programmed the ***REL layer generation*** *option****,*** which generates a REL giving a file name and a field name (when a layer is chosen, a list of the fields of the layer is displayed) and ***indicates which fields can be used as an entity identifier.*** In fact, this idea is not new, because when opening point layers from table files (MDB, etc) one could already indicate the existence of a field acting as an entity identifier and simultaneously specifying metadata, such as field units, descriptors, etc. For more details contact us at suport@miramon.uab.cat and ask for the technical document ***OberturaDirecta_i_amb_Metadades_DePuntsUbicatsEnTaules_vx,*** which lays the foundations that have now being extended to entities, which are not strictly point natured (lines, polygons).

Direct opening of points located in tables of DBF, MDB, Oracle, etc.

To advance giving a unified reading of REL files, it has been decided to adapt the window "File | ***Open vector | Open points into table or layer in spatial database"*** to continue accessing what was used to be accessed (layers of points taken from DBF tables or tables contained in databases like MS-Access or any large database manager via ODBC) and, moreover, ***to open the REL of the ArcSDE layer.*** The new menu option is called ***"Open points in table or layer in Spatial Database Source".***

The option "Open points into a table or layer in spatial database" also allows opening an SDS file. ***It is important to understand that a REL file (unlike an SDS file) already has the name of the entity identifier, while an SDS only contains the data connection.*** However, if a REL file name is the same as the directory name; ***it can complete the SDS information with metadata, the field name of the entity identifier, etc, thus having a higher control of the layer to be open.***

MiraMon allows opening a REL layer of ArcSDE or an SDS file ***both by command line and by dragging them*** to the program window. Similarly, it allows ArcSDE REL file references and SDS file references to be part of a map, as mentioned in the corresponding section

The document OberturaDirecta_i_amb_Metadades_DePuntsUbicatsEnTaules_vx has many details about the opening of these resources.

4. Symbolization and fonts

4.1 General aspects

It has been set that if a ***colour palette or any symbolization table had been modified*** from the legend or from the "Advanced" box; the word [Modified] will appear preceding the name of the palette in the symbolization box. Thus, if one selects the "OK" button, the program understands that it is wanted to keep the palette with the colours changed, rather than as done previously, where a message was displayed saying that the suggested changes would be lost and advising to press the "Close" button. With this, it is achieved that the dialogue is much more natural.

However, it is also necessary to have a way to reload the original colour palette and, for that, one needs to click the browse button and re-select it (the [Modified] mark will disappear) and it will proceed to change the palette (the modified palette) for the new palette (reread).

4.2 Raster symbolization

In this new version, ***rasters*** (not RGB composites, which symbolization have different nature) ***have a symbolization box similar to that of vectors***, so that it ***can be set to constant colour*** (filling the entire raster except for the eventual areas with NODATA, which are treated as transparent) ***or through a colour***

palette. In this case one can access the Advanced Options box, on the assumption that treatment of quantitative data of the pixels indicates the number of colours of the palette, minimum and maximum desired, or type of assignment (direct, linear, logarithmic, etc). As always, MiraMon chooses the most suitable parameters with its internal heuristics based on the raster types, metadata, etc, except when the file already indicates, through its REL or through the map that opens it, what are the desired options; although the MiraMon heuristics have been proved successful for many years, it is also true that in some circumstances it may be necessary to apply different symbolization strategies.

In the case of ***RGB composites***, the symbolization box allows ***to indicate which pixels should be displayed transparently*** (none, NODATA, the white ones, etc).

It has also been programmed that, from each raster symbolization box (including JPEG2000, BMP, etc) and RGB composites, it is also possible to:

- ***Indicate the percentage of transparency of the layer***. This percentage is consistent with the use of completely transparent colours in the palette.

- ***Invoke the image enhancement box***, also for the two types of rasters.

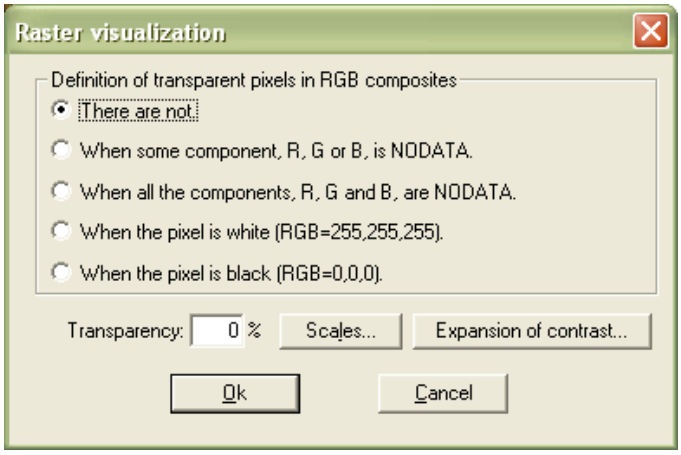
- ***Indicate the range of scales where the layer is visible***.

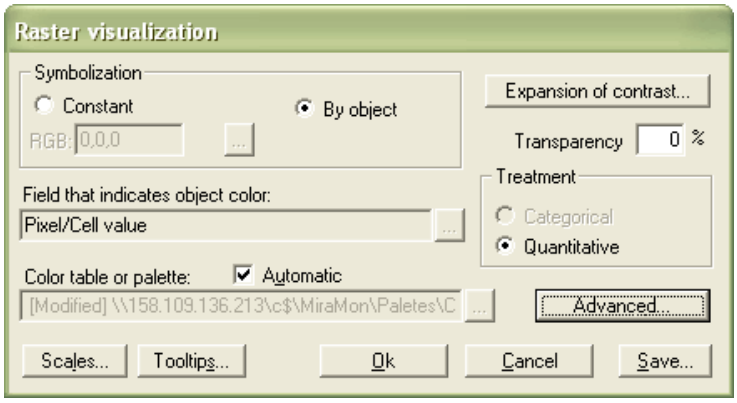
It has been implemented the ***transparent colour*** in the raster symbolization tables, symmetrical to that of vector tables both for RGB combinations and rasters with palette (also supported for rasters of ***more than 256 categories).*** The interactive indication of transparent colour can be done through the legend, by double-clicking the corresponding symbol, or also from the symbolization box for 24-bit files (for RGB combinations as well as for JPEG, JPEG2000, etc). Its use in a layer makes its drawing a bit slower (MiraMon has to analyze the presence of transparent pixels for that view and, if so, it has to ask Windows to make a specific display, slow enough to allow in some places total transparency).

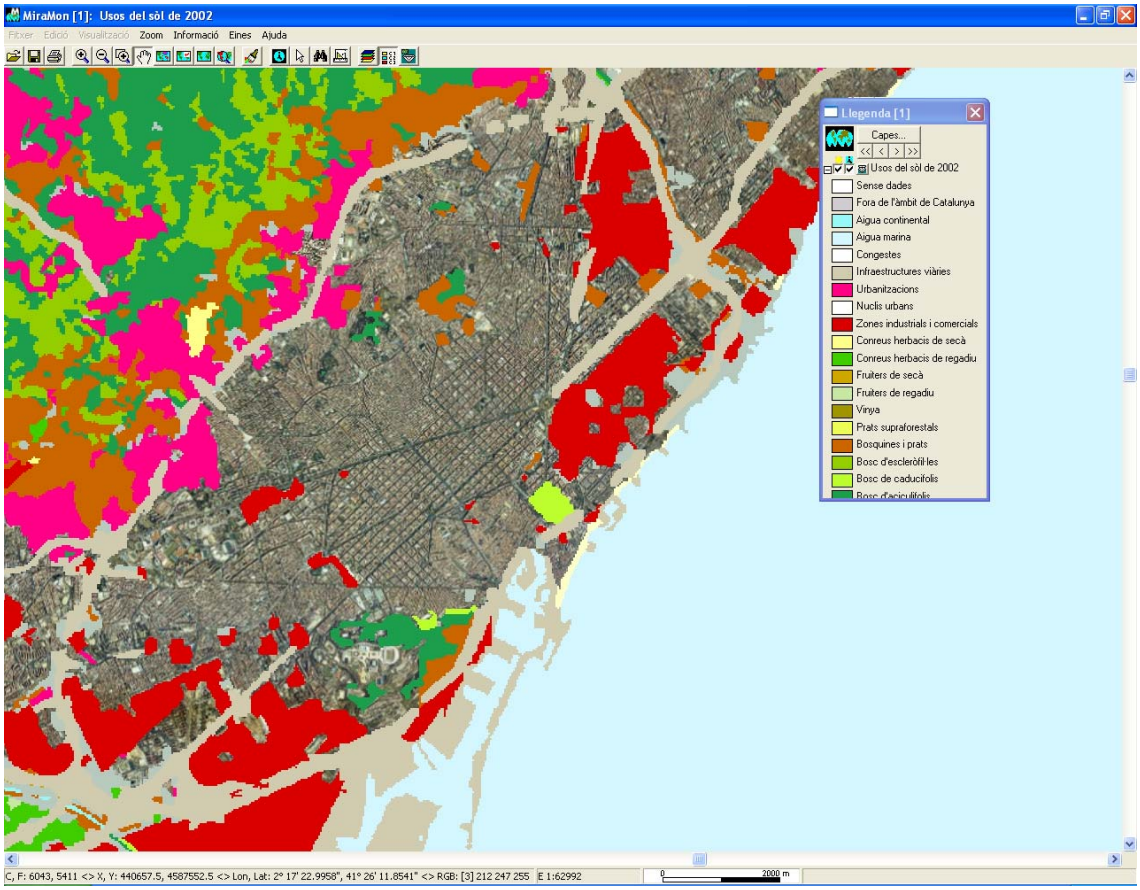
The ***properties of full transparency*** are also completely symmetric to those of vectors: ***RGB*** intensities ***(-1, -1, -1)*** are indicated ***in the table of symbolization,*** can be applied to any symbol, including NODATA value, and it is symbolized as transparent in the printed legend, while on the screen the legend is symbolized with the background colour that the user has chosen for MiraMon ("View" menu). The interactive indication of a transparent colour can be done from the legend by double clicking the corresponding symbol on the legend; it is also supported for *integer* type rasters or *long* rasters associated to a legend (i.e., rasters with more than 256 categories). Support has also been given to the indication of transparency in the RGB combinations; in this case, it is indicated by the ***key Color_Transparent=*** from the section ***[RASTER_RGB_ #]*** from MMM files; currently the key can take the values of ***"3xNODATA, "NODATA***", "***White***" and "***Black***", which indicate, respectively, that the transparent pixels are those with NODATA for the 3 RGB values, with NODATA for some RGB

values, completely white or completely black; besides stating that via this key from the MMM files, the transparency of 24-bit files (RGB combinations as well as JPEG, JPEG2000, etc) can also be indicated by the dialog box that appears when clicking on "View" from the layers manager or from the legend. Do not select colours or RGB transparent combinations unnecessarily because, as mentioned, its use in a layer makes the drawing in Windows a bit slower; if necessary, from the 4 modes, the fastest is the "NODATA"; on the other hand, 3xNODATA is purely experimental because it can create strange visual effects as the pixel with NODATA value in a band is prepared with a special value (typically 255) to prepare for the transparency effect, but if other RGB components of the pixel do not happen to be NODATA it will then loose its original value.

The following screenshots illustrate these improvements in the display of rasters:







Note in the above figure, that the colour of urban areas has been defined as transparent and therefore, the land use raster allow us to see, in these areas, the underlying orthophoto.

Finally, the program currently supports, in multiband rasters, the simultaneous use of sections **[COLOR_TEXT]** (as a generic indication of the symbolization to be used for the bands that do not have a specific section of symbolization) and for sections **[COLOR_TEXT:NOM_BANDA]** (as an indication of the specific symbolization of the band) in the same REL. Similarly, it supports the section **[VISU_LLEGENDA].** Thus, a multiband raster can now have a general symbolization for all bands, but also a specific one for the appropriate bands.

Information balloons release (tooltips). It has been incorporated the functionality of floating balloons *(tooltips)* for raster layers, so that it may be set that a layer provide contents on the screen based on a field when placing the mouse over a position. This feature is disabled by default and can be accessed from the display window of the selected raster layer. More details can be found in "Information Balloons *(tooltips):* an alternative fast location consultation".

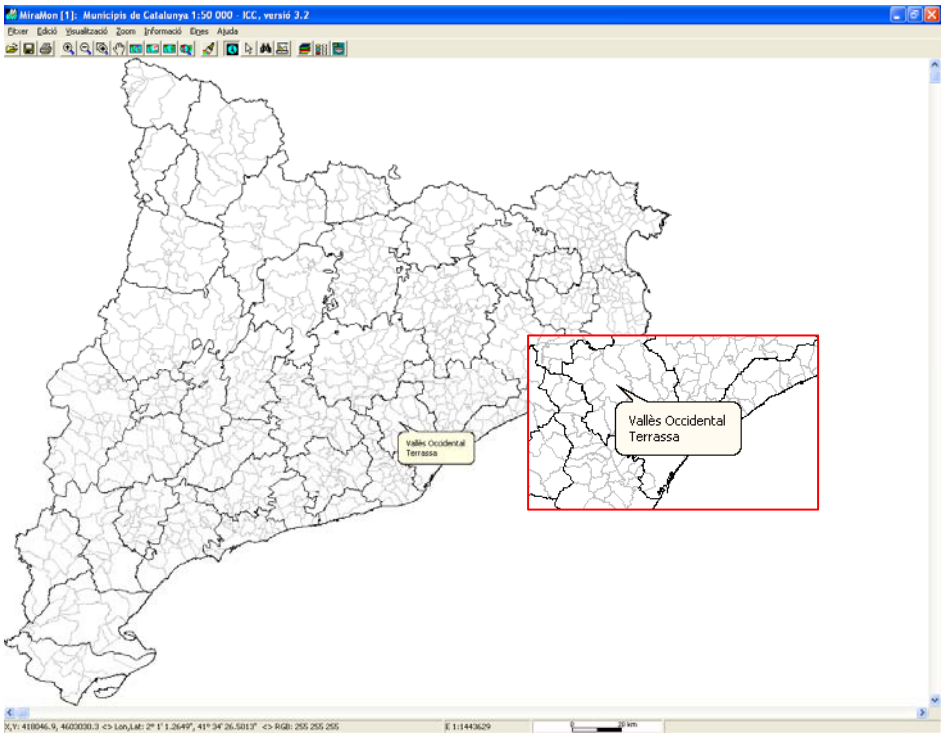
4.3 Symbolization of vectors

Better importing and reading CAD files.

It has been incorporated the capabilities of ***text symbolization*** of MiraMon during ***DGN*** files import, as well as other improvements. In the case of ***DXF,*** it

also reads the symbolization of text colour and in both cases ***line thickness*** is symbolized when possible. The symbolization is constant for layer, provided that linking to a table is avoided. On the other hand, the symbolization *of* ***line type*** for layer is constant provided that all the layer lines have the same symbolization. In the case of CAD reading from MM32, ***polygons are generated for each closed arc,*** rather than by layer as done by the original DXFVEC. In addition, from the objects considered in the DXF format and that can be filled (solid, circles...), the closed arcs can also generate polygons, although the symbolization colour is transparent.

Information balloons release (tooltips). It has been incorporated the functionality of floating balloons (tooltips) on vector layers, so it can be set that a layer provide contents on the screen based on a field when placing the mouse over an entity. This feature is disabled by default and can be accessed from the display window of the selected vector layer. More details can be found in ***"Information Balloon (tooltips):*** an alternative fast location consultation".



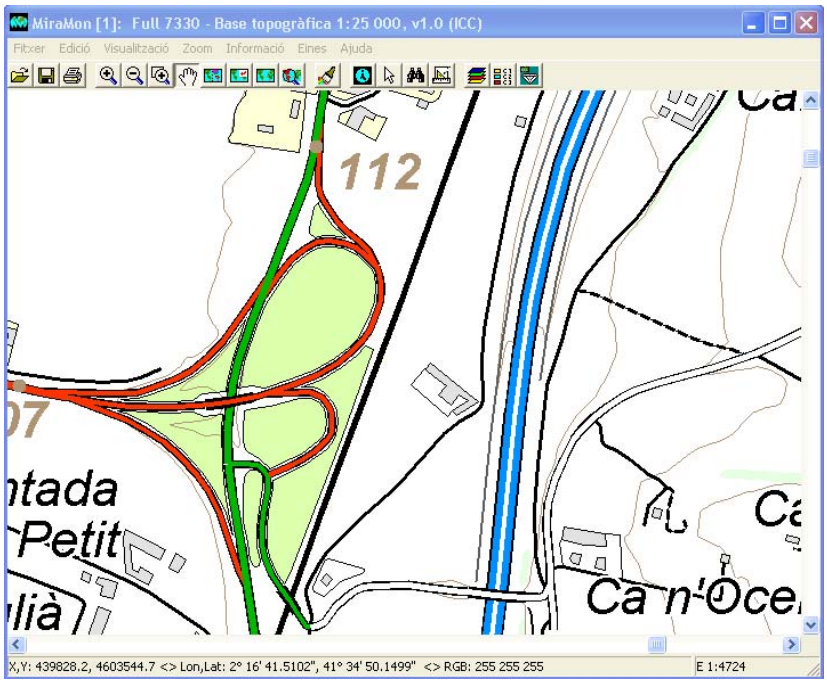
More possibilities allocating symbols of point type vector entities.

It has been done that the ***symbols of the point type entities,*** in addition to EMF and WMF files, can also be ***JPEG, PNG, BMP and GIF*** (and even mixed in a single symbolization table). It should be remembered, however, the graphics limitations of these formats if they have to be represented in a resolution that reveals their raster nature.

Consolidation of the text symbolization based on complex fonts. Text symbolization has been strengthened, allowing ***colours, map units sizes or typographic sizes, object characteristics, object and layer family characteristics,*** etc. Many of these sophistications have been applied successfully and stably to thousands of ICC topographic sheets distributed in

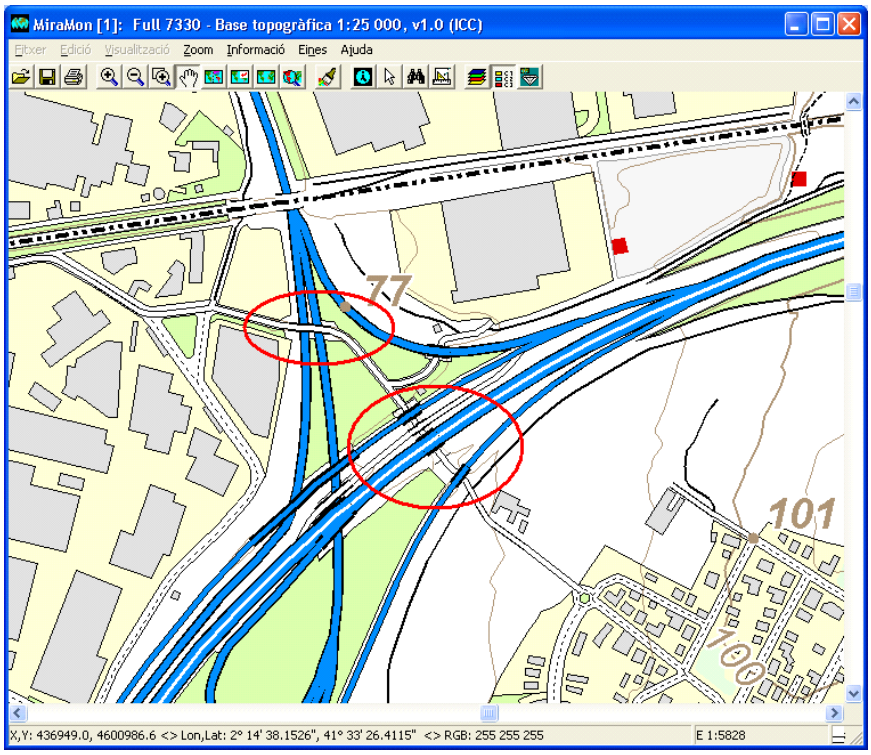
MiraMon format at 1:5000 and 1:25000 scales and, very soon, also at 1:50000 scale. For more details you can ask us for the technical document ***SimbolitzacioFonts vx.doc*** at suport@miramon.uab.cat***.***

Combined symbolization lines and partial multiseries. The new combined symbolization lines allow to correctly represent complex linear elements such as roads, highways, etc. As it is usual in MiraMon, the thickness of each elemental line that forms the combined line can be indicated in ***pixel units* or *map units***; in addition, when indicated in pixel units, the thickness of the print is configured within a precision of hundredths of a millimetre. ***Each elemental line may be configured at line type level (solid, dashed, etc), thickness, colour, end shapes, etc.*** The following figures illustrate 3 examples of combined lines, and its representation in a 1:25000 map of the ICC.



The combined lines have a wide range of technical possibilities (they can be specified as constant for an entire layer, for an object, with automatic symbolization table, etc). For more details you can ask for the document ***SimbolitzacioLiniesCombinades_vx*** at suport@miramon.uab.cat.

A particularly interesting feature is the **use of combined lines together with the partial multiseries.** This outstanding property makes possible, for example, ***to draw a section of highway over or under a county road, as appropriate.*** The combined lines are fully compatible with the use of partial multiseries, obtaining the effects highlighted in red in the following figure.



4.4 Symbolization on databases from ARCSDE

It allows the ***inheritance of symbolization from REL layer files with connection via SDS***.

5. Queries and Selections

5.1. Improvements of some query by location features

It is supported the reading ***of any greyscale raster*** (bands) existing within a ***multispectral or hyper-spectral JP2.***

It has been set that ***categorical rasters of more than 256 categories*** may be accessed by attribute (before, it was correctly symbolized but there were limitations regarding queries).

Queries by location on ECW format have been implemented***,*** both 8 and 24 bits, when not loaded in memory but dynamically read from the original file or from the resource ecwp:// and it has been programmed the dynamic switching between memory mode and original file mode.

On the other hand, when saving a ***raster selection,*** if the resulting file of the selection is compressed, ***the application also saves it both as indexed and as compressed,*** thereby accelerating subsequent queries and its visualization when choosing not to load the file in memory.

Finally, two ***improvements have been added to the query by location and by attribute/interactive which apply to the digitization of structured vector layers.*** The understanding of these 2 improvements makes it worth to recall, through 4 backgrounds, the building philosophy of the Single Table in MiraMon:

- Background 1: In order to speed up the display of a layer, MiraMon only generates the Single Table of the layer when it makes sense to do so (the user has the option activated, and the layer requires it depending on the number of tables linked to the main table, on the nesting level, on the type of cardinality of the relationships, etc).
- Background 2: In case it is sensible to generate a Single Table of a layer, it will not be generated until needed (when performing a query by attribute or performing an interactive selection on it).
- Background 3: The existence of a Single Table allows, when querying by location, a higher response speed and, if multiple register exists for a single object, a display of the successive records are listed in the same order as the one in the Single Table.
- Background 4: When digitalizing a structured vector layer the main table is modified; therefore, if the layer has a Single Table, generated following what has been explained in background 1 and 2, the Single Table is not synchronized permanently because it would consume time that in very complex layers and slow computers and/or slow networks could make its digitization little agile; this can lead to the fact that, for example, querying by location on recently digitalized objects, do not display its content on the database immediately.

On this basis, the following improvements have been made:

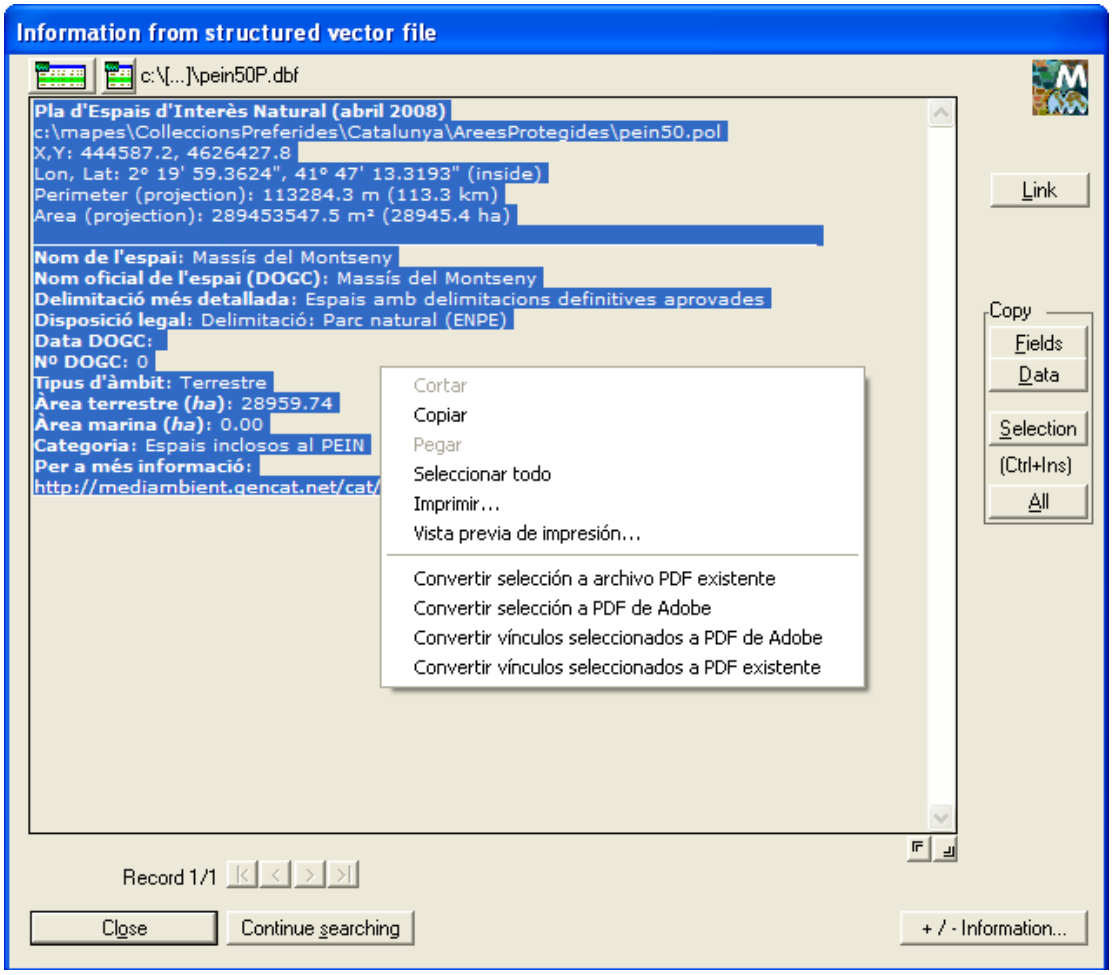
- Improvement 1: It has been changed the behaviour of the query by location; now when ***digitalizing a structured vector layer, the query by location on this layer is done ignoring the Single Table, when it exists and is older than the Main Table*** (i.e., when the situation explained in Background 2 have not been met yet).
- Improvements 2: ***When trying to access the Single Table*** (for example when querying by attribute), ***this is regenerated if it is proven that the Main Table has been amended*** or, according to the case, it is recommended to press the Single Table regeneration button.

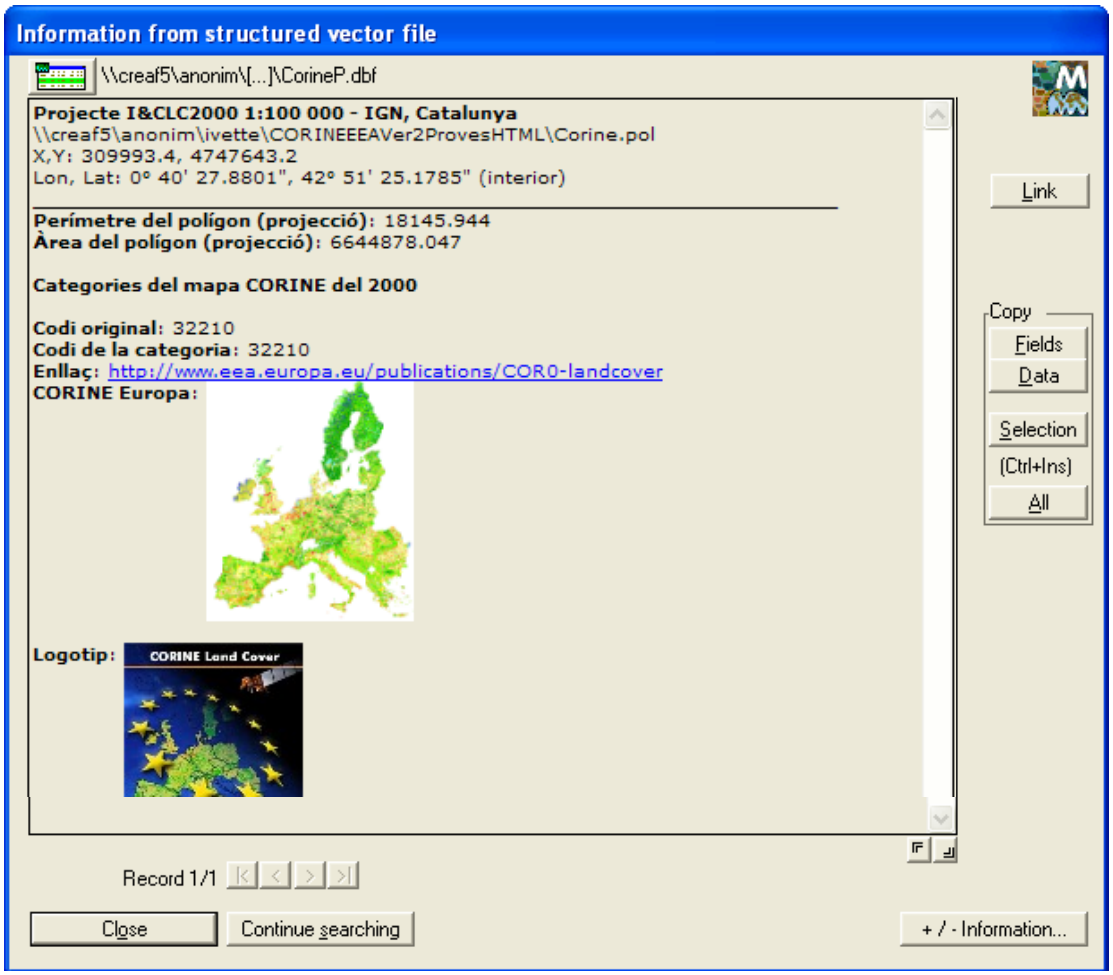
5.2. Updates in the query by location box

It has been incorporated the use of ***HTML resources in the query by location window*** similar to some tabs from the Metadata Manager of MiraMon, GeMM (see section 8.1). This allows using the ***typical features of Internet browsers:*** view font code, select a text and convert it into PDF, etc...

Note that, now, ***if the alphanumeric database associated, or even the separators contain HTML code, this will be exactly interpreted as an Internet browser.*** The applications of this are very diverse and considerably enlarge the already rich query by location information from MiraMon (which already had configurable text sizes in the separators, colours, units from the

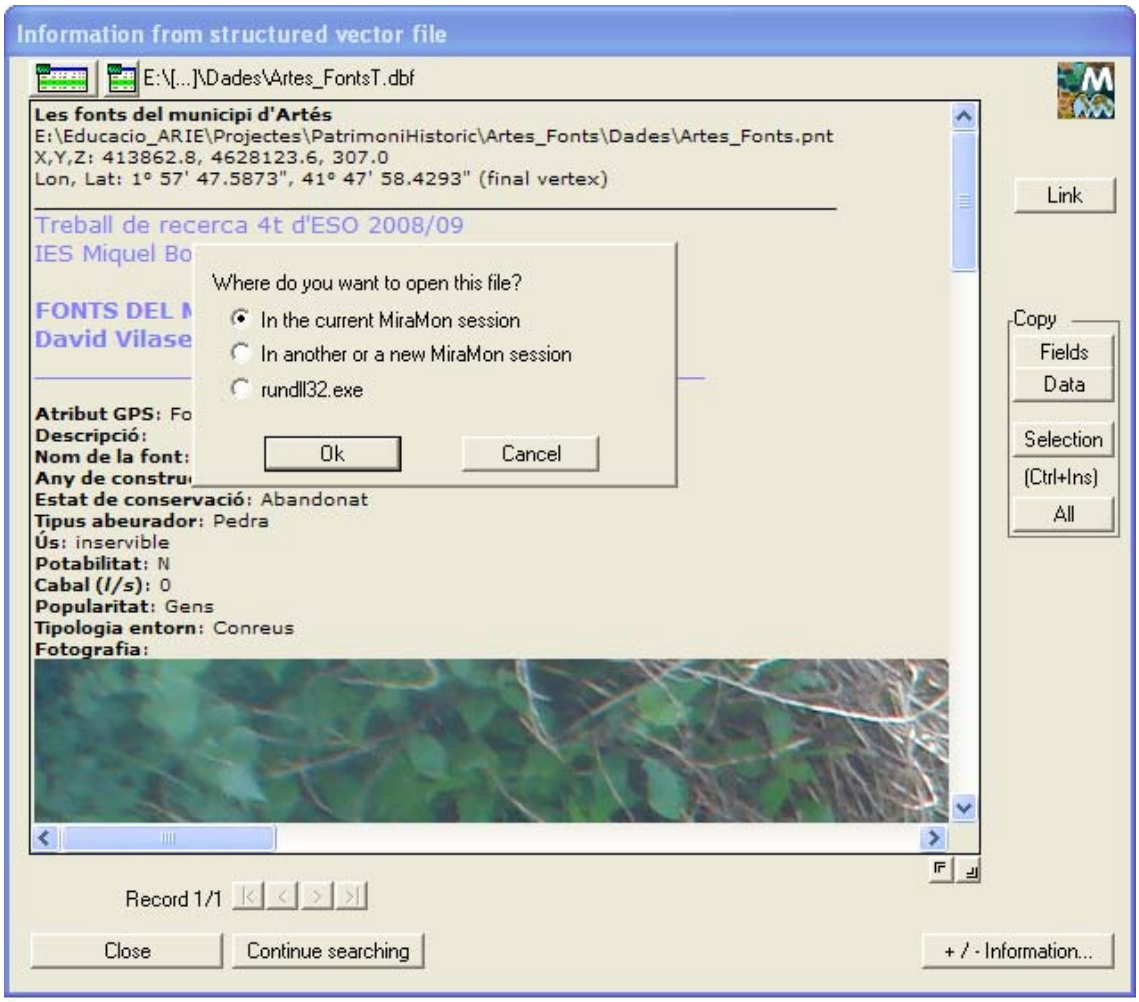
metadata in the fields of the databases, etc) with possibilities such as ***embedding an image in the query*** (done by declaring the field both as hyperlink as well as embedded content, and then it will draw the image in its own box). Here are some examples (right-click functionality, HTML text in separators and embedded images):





It has been permanently removed the textual button of the "Main Table" of the query by location box for a iconic button similar to the interactive selection box and, moreover, it has been added another iconic button to open the "Single Table" with the corresponding record marked in green (see illustration). In both buttons is set to appear *"Tooltips"* (small help labels) explaining its function.

The new HTML query environment also holds the functionality whereby when one calls a link to a MiraMon format, such as a JPEG, but that it can also be opened with another installed application, there is also the 3rd option to inform the operating system were to open it "In this MiraMon session" or "In a new or another MiraMon session".



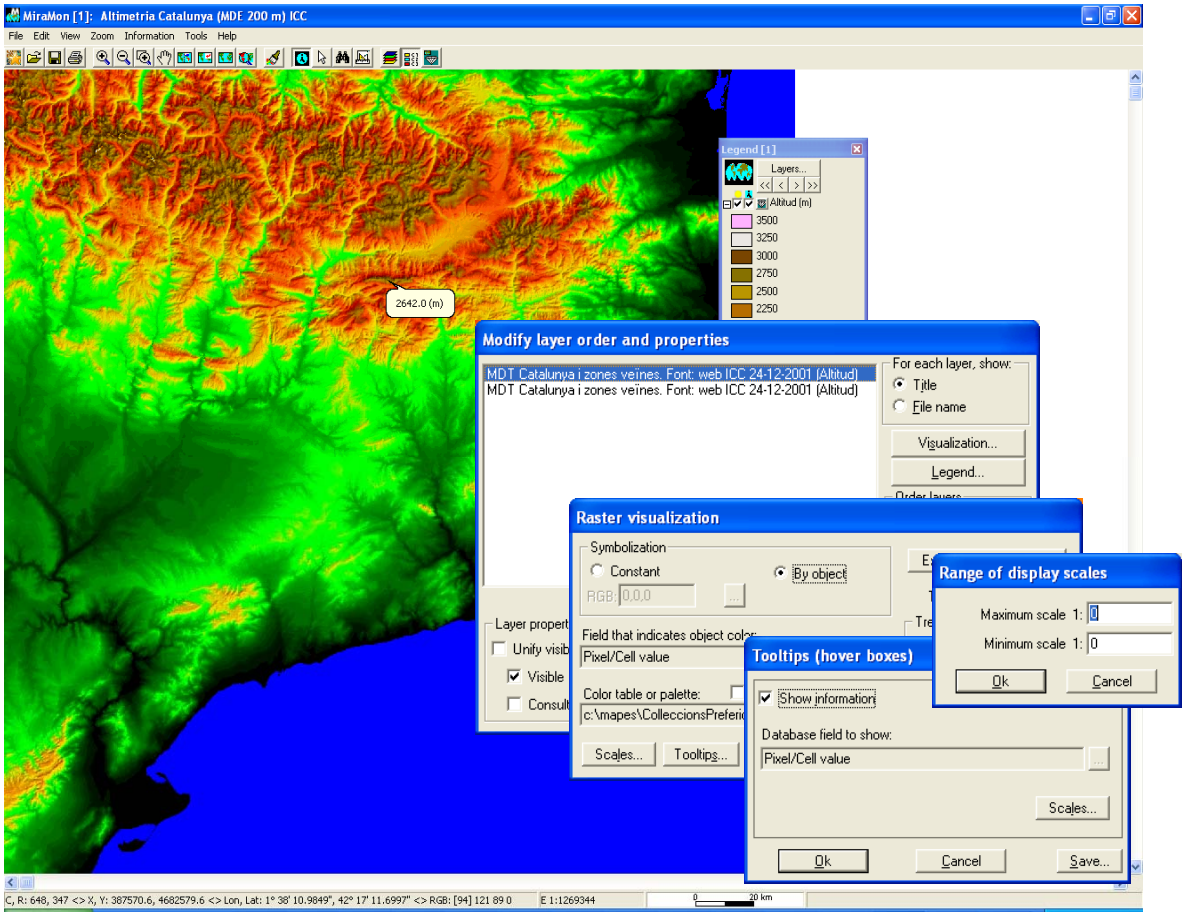
5.3. Information balloons (tooltips): an alternative fast query by location

MiraMon incorporates the ***information balloons (tooltips)*** functionality for both raster and vector layers, so that it can be set that a layer shows its contents in a text balloon when placing the mouse over an entity or position. When asking for information balloons ***to more than one layer, the contents are displayed one below another in a single balloon.*** If a layer is declared not consultable then, the information balloons will neither appear (but note that one can declare a layer not visible and, therefore, there will be “background” layers, which do not consume redrawing resources nor appear in view, but that provide values when moving the cursor over them).

On the other hand, information balloons ***show the correspondent units,*** provided that the value has any and that metadata indicate that it is desired to display the units, both in rasters (also multiband) and in vectors.

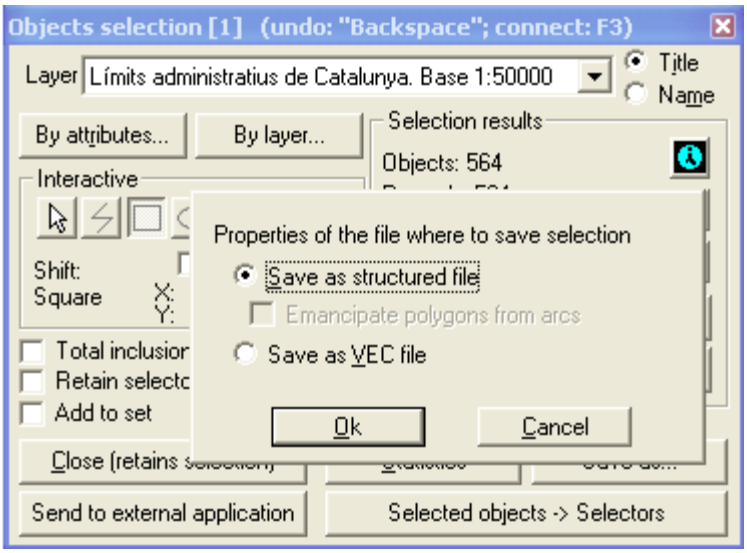
In the rasters case, the cell information appears as a text balloon that displays the DN of a Remote Sensing image, the altimetry value of a DTM or a category in a categorical raster linked to a thesaurus.

The following illustration shows a DTM and a coloured by a municipal boundary region, to which it has been requested that both the value of the DTM raster (elevation in meters) and the vector based field that provides the name of the municipality are displayed in the informative bubble. Note that ***the balloons can also be limited* by *scale*** for each information layer.



5.4. Emancipate a polygon layer selection

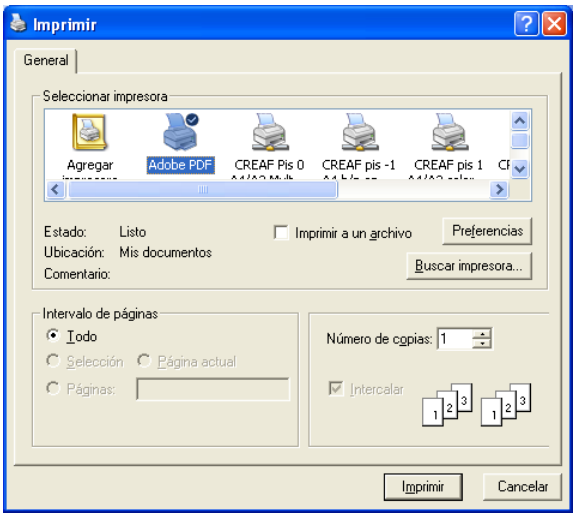
It is now offered the possibility of generating a selection that is not dependent on the arcs from the mother layer of polygons (emancipated), when, after an interactive selection or a selection by attributes has been done, it is indicated to save this selection.



6. Printing

6.1. Improvement of some general features

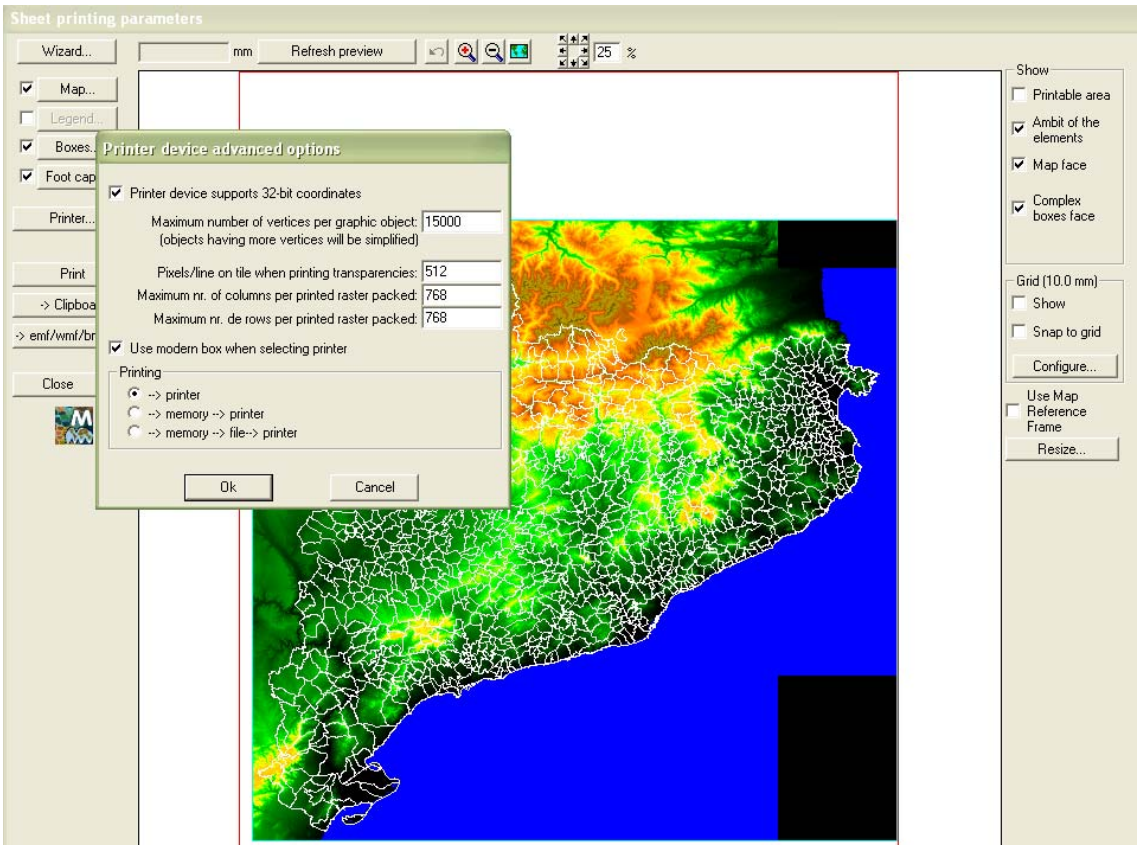
- Halting the redrawing is activated ***by pressing the Shift key.***
- It is changed the default behaviour when opening the printer selection box ("Print..." button from the printing design box): it now ***opens by default the modern box (which allows printing into a file without having to redefine the printing port)*** instead of the classic Windows box.



- The default behaviour when opening the selection printer box can be changed from CaixaModernaTriaImpressora= parameter in the [MiraMon] section defined in MiraMon.par file. This setting allows to decide what printer selection box MiraMon will open by default, when pressing the "Printer..." button from the Sheet printing parameters: the classical or the modern of Windows (which allows printing into a file without having to redefine the printer port). The behaviour within each

MiraMon session may be changed from the button "+..." from the Sheet printing parameters box.

- It has been added a new parameter in the ***"Printer device advanced options" box,*** accessible from the "+..." button from the Sheet printing parameters box, which allows to decide whether to print directly from the printer, to do it previously in memory, etc, and which is particularly useful when printing complex documents (with transparencies, partially transparent, etc) in large format printers (plotters). This parameter can also be set from the key. GenerarImpressioAOrdinadorAbansDEnviarAImpressora= from the [Hardware] section of MiraMon.par.



Mode 1 (memory → printer) is always recommended when having problems with large format printers, when using transparencies, etc. ***Mode 2 (memory → file → printer)*** despite being the slowest, it is more robust and it is the only one that works properly on HP 9600 printer when asked for partial transparencies due to some Windows API features are not fully functional in the printer's driver. ***The quickest mode by far, is still the mode 0 (printer).*** We recommend ***using mode 0 when designing the printing (preview)*** and mode 1 or 2 for printing on paper when requested by the printer (which can be noticed when the impression is not correct: partially transparencies appear opaque, wrong thickness, etc).

- It has been solved an issue regarding a package printing and it has been achieved that multiple printers (SHAR-AR-M276 PS [A3 and A4], HP

Color LaserJet 5500 PCL6 [A3 and A4], HP Color LaserJet 5550 PostScript [A3 and A4], HP Color LaserJet 5550DN [A3 and A4], HP Color LaserJet 4650 PCL 6 [A4], HP LaserJet 4350 PCL6 [A4], etc) and plotters (HP DesignJet 1055CM [A0], both in large or small tiles, in normal or optimal quality, creating the impression in the computer as well as in the printer) can now be performed correctly, despite printing transparencies had problems in the previous versions.

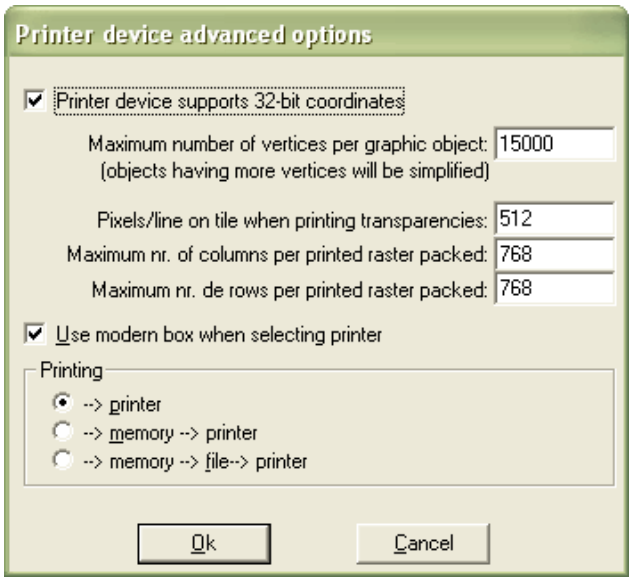
- Note that in plotters which have little memory installed (such as the HP DesignJet 1055CM) when asked for A0 at the highest quality (optimal - improved) it must be indicated on the advanced properties tab that the document has to be processed in the computer (rather than in the printer).
- Printing in BMP (as well as in JPG) also works well, although in some cases the driver may reduce the desired resolution; HP DesignJet 1055CM plotter driver has been used to normally generate an over 400 MByte file (approx. 14,000 rows x 10,000 columns).
- It has been shown that the patterns also work well in previous devices, and even combined with transparencies (the plot becomes more tenuous).
- It has been demonstrated that impressions in EMF with transparencies are correct.
- It has been set that when printing on a BMP or on a JPEG, these remain ***georeferenced*** using the corresponding B.rel and J.rel files. This allows reusing MiraMon digital prints as working rasters (i.e. creating background cartography for visual reference).

6.2. Printing line widths

It has been adopted a treatment such as in the Automatic case (similar to the screen) of line thickness, point radius, etc. In this case MiraMon apply an exaggeration of the number of pixels used in the printer ***so that the element occupies the same width than in the screen.*** To perfectly work, it must correctly set the screen width in mm in the MiraMon.par or in the appropriate setting option (for example the zoom scale). In this situation we have a WYSIWYG *(*What You See Is What You Get*)* environment*.* So the exaggeration factor in printing is ignored when pressing the “Map | Advanced” button. ***Naturally, when the thickness is indicated in map units, these comments do not apply because the program calculates the pixels of the printing device that has to be used in each case for the thickness to be correct.***

6.3. Advanced options of the printing device

Control of the raster packages size: The "Printer device advanced options” box, accessible from the "+..." button of the “Sheet printing parameters”, has been improved with new parameters that allow controlling the maximum package size that MiraMon sends to the printer when printing rasters. These parameters can also be set from the keys of the same name of the [Hardware] section of MiraMon.par.



Printing vectors by packages or tiles: Printing is performed by "packages" or "tiles" not only in rasters but also in vectors, which avoids the fact that many printer drivers do not support effects like transparencies or patterns in complex vectors (many vertices, many inner holes, etc). MiraMon works from the number of pixels on the side of each tile over which will be assembled on the printing device; the default number is 1000, but it could be change if needed: larger values make the printing faster but it becomes more sensitive to having an eventual problem of disappearance of transparencies and patterns; values greater than the number of pixels of the largest side of the paper (information that can be found by pressing the "i" button from the "Map printing parameters" box) will be printed as before, in a single tile (if you do not wish to look for that particular value, you can use directly a very high value, such as a million). Smaller values than the default ones would not seem to be necessary, since the size of the tile is similar to that of a high resolution screen, which has not been appreciated to have problems with transparencies or patterns. The use of a single tile can still be interesting for advanced uses when a EMF vector result is desired and we want vectors not to be divided, so it would only be suggested to commute to the "printing tiles" mode when there are patterns or transparencies, although the user can set the new mode from the "+..." button from the "Sheet printing parameters" box. So far, it has not yet been introduced the possibility of varying the side of the tile by the user, which will consider based on the needs and demands of the users.

Additional comments on printing device drivers: It is important to have the latest updated versions of printer and plotter drivers. For example, the HP DesignJet 1055CM plotter with version 4.63 of the driver allows printing texts, even in layers without any complexity and A4, when printing partial transparencies and when using the option "Print to printer" driver. However, with version 4.67 of the driver the behaviour is correct.

We have also noticed that some recent PostScrip plotters have problems printing partial transparencies. This issue has been notified to the manufacturers and they are studying it. However, our recent programming, described above, has managed to avoid this problem.

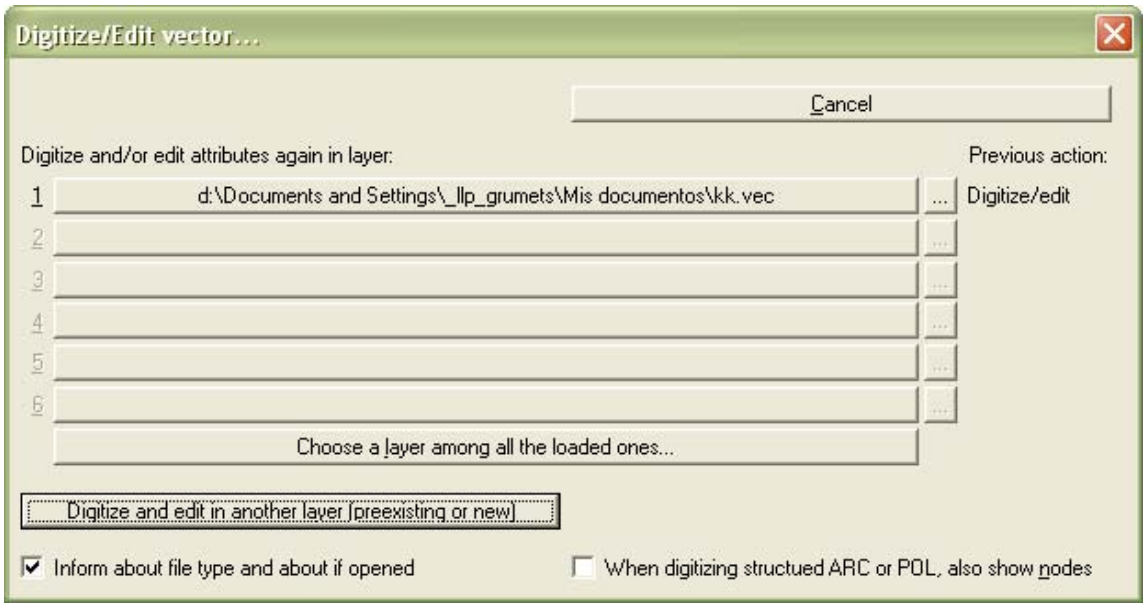
7. Vector editing and digitizing

Various aspects have been consolidated and new ones have been improved, such as the confirmation request before generating multirecords in the database, the new digitization box, continuous connection when digitizing or the new floating tool bar of digitization

7.1 Starting digitizing box

It has been created and gradually improved a dialog box that appears when we have to digitize and edit a vector layer (F2) or editing its attributes (Shift case +F2). The new box provides a list of up to 6 layers that have been opened for digitization during that session of MiraMon (if less, it completes the list with other vector layers opened, with preference to those located "above"); this way, with a single click the box will take you back to digitize/edit on a layer which we had already worked on or on a layer which is already opened.

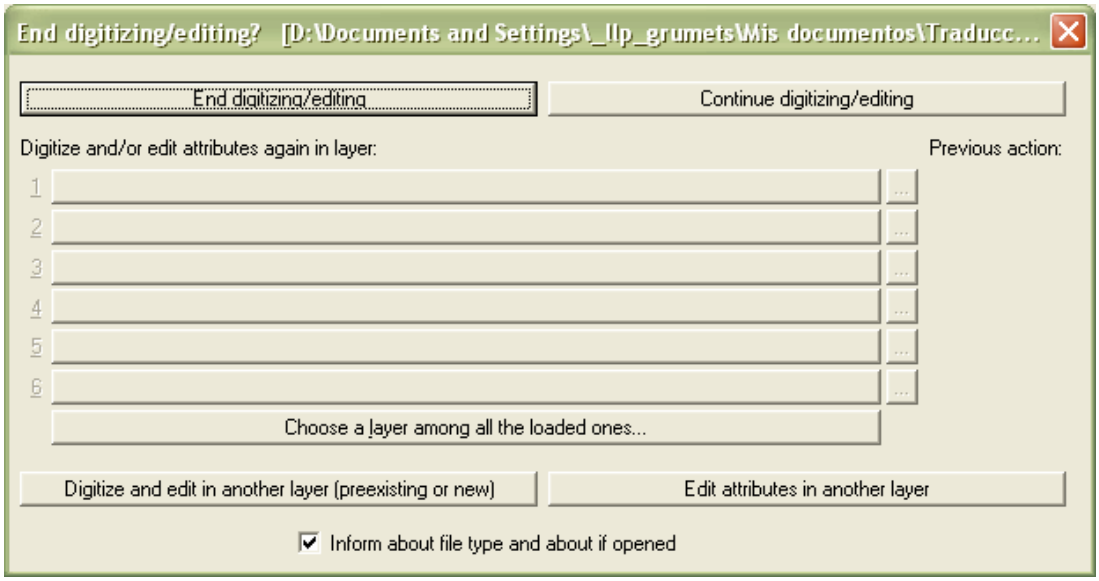
To further accelerate the access of working with different files, each layer of the list is preceded by a numeric value (from 1 to 6) that can be used as a shortcut of the keyboard and so avoiding moving the mouse (i.e., we can press F2+layer number and continue to work with the new layer which attributes were being digitized or edited. If the total number of layers loaded exceeds 6, the "Choose a layer among all the loaded ones…" button allows selecting from the whole layer list, as well as switching between layer names and titles, for an eventual resolution of doubts. Logically, the box also has another button that allows you to browse and select other layers, preexisting or not (in the case of editing the attributes the layer must be preexisting).



The program ***remembers when a layer had been opened in digitize/edit mode or simply in attributes edit mode***; this information appears on the list and it is appropriately applied when reopening the layer from the shortcut of the new box. It is also possible to open a layer in both modes, and so both options will be offered.

The "..." button allows deleting from the list those layers that we do not wish to be offered as previously digitized layer.

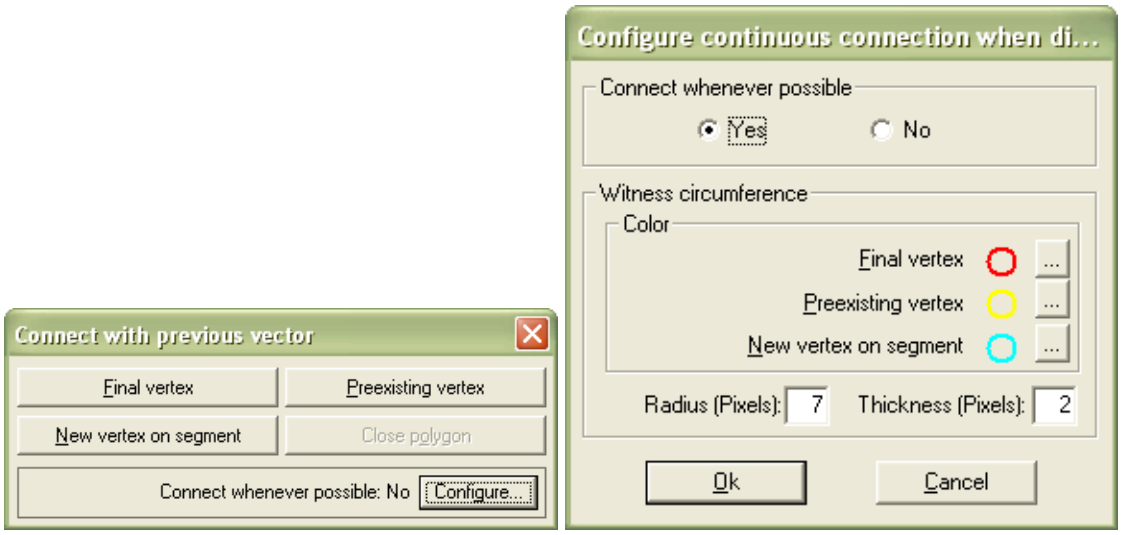
Similarly, it has also been created another dialog box, with similar appearance to the previous one, which pops-up when we are about to finish the process of digitizing or editing attributes. The new box allows, besides the expected confirmation options of ending edition or continuing this, shortcut options to continue the task of digitizing/editing or attribute editing similarly to those that appeared at the start of digitization.

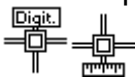


Finally, from the new boxes it is possible to disable the "Inform about the file type and about if open" option, thus the number of interactions via mouse or keyboard to continue working with another layer is even lower.

7.2 Continuous connection when digitizing

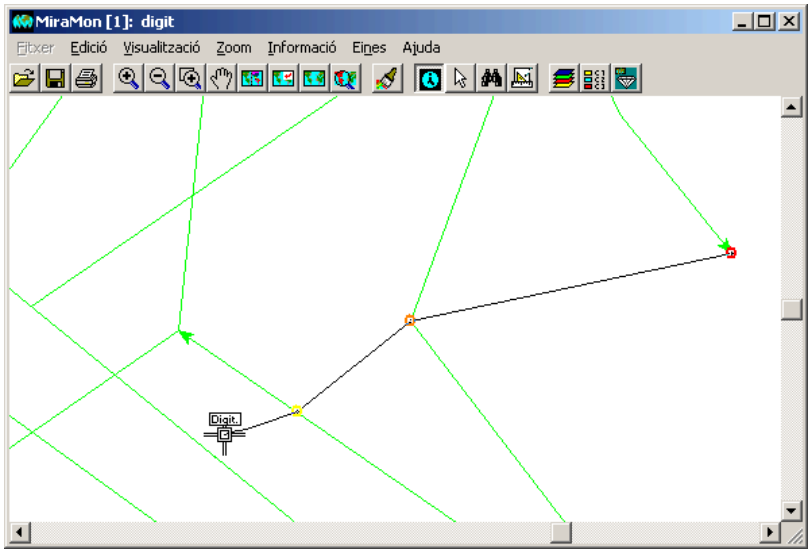
It has been implemented the new continuous connection mode, or “Connect whenever possible”. The new mode, configurable by default from the MiraMon.par, tries, for each click of a digitization process, to establish a geometric connection, exploring all the possible connections (final vertex, preexisting vertex and new vertex on segment) before assuming that it must generate a new vertex. The mode is compatible with the specific request of one of the possible connections. That is, when activating new mode of continuous connection we may also ask, for example, to make a connection on a final vertex and on the following click the program will just explore this possible connection and, if no entity has been found to make the connection with, it will inform that it has not been possible to do so, without generating any vertex.



The MiraMon cursor reports at all time, if we are in this new mode, since its central area takes a selector appearance (square) to facilitate the display of the items that connect to: 

In the new mode, the user is informed that a connection has been made through a small **witness circle** at the point where the new vertex has been generated; the colour of the circle is:

- **red** if the connection has been generated in a final vertex
- **orange** if the connection has been generated in a middle vertex
- **yellow** if it has generated a new vertex on segment



The mode is compatible with the specific request of one of the possible connections (i.e., when continuous connection is activated (F3Continu), we can also request for example, that we want to make a connection on a end vertex and in the following click the program will just explore this possible connection and if no entity is found to connect to, it will inform that it has failed, without generating any vertex). In the classic mode, the user was informed about the successful connection simply because the program did not said it had failed to make the connection; in the new mode, the user is informed that a connection has been made through a small circle drawn at the point where the new vertex has been generated; the colour of the circle is red if the connection has been generated to a final vertex, yellow for an intermediate vertex and blue if a new vertex on segment has been generated, but the colours, thickness and radius of the witness circle are configurable from control keys:

ColorVertexFinal_F3Continu =, (Final vertex colour)
ColorVertexIntermedi_F3Continu =, (Intermediate vertex colour)
ColorVertexNou_F3Continu =, (New vertex colour)
Radi_F3Continu = (radius)
Gruix_F3Continu = (thickness)

From the [MiraMon] section of the MiraMon.par file; the witness circle disappears in the next redrawing operation (zoom, F5, etc). When working in the new F3Continu mode, the cursor has an appearance that combines the classic digitize look and the selection look, thus visually reminding that it is in digitizing mode while the cursor selection window allows a better control of connections, due to the fact that within the window it is possible to see the preexisting entities. In the case of digitizing selector objects in an interactive selection, or making quick measurements with the ruler tool, all these properties are also applicable. The digitizing cursor and the ruler cursor also reflect when working on the new mode. The option can be configured by default through the F3Continu= key of the [MiraMon] section from MiraMon.par file.

For more details see technical document
ConnexioContinuaEnDigitalitzar_vx.

7.3 The floating digitizing tool bar

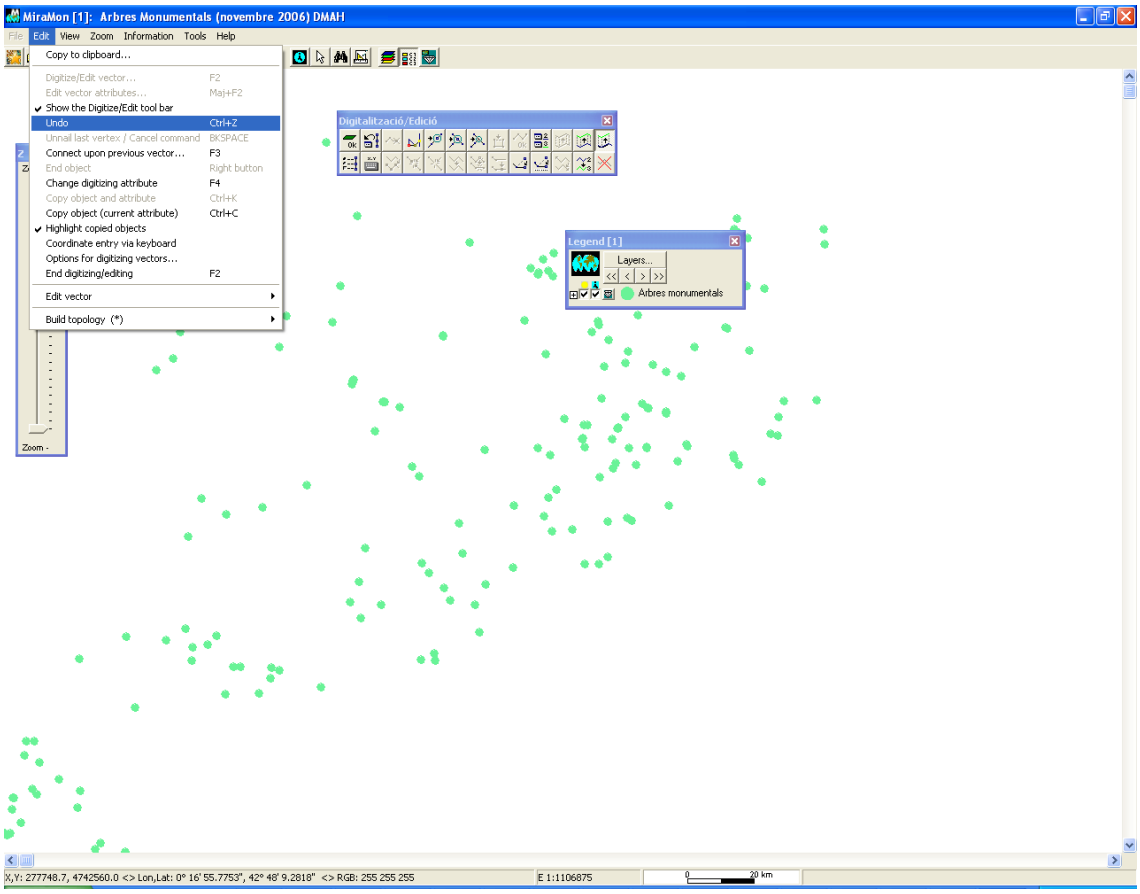
The floating button box include all the digitizing/editing options; when bringing the cursor close to each button, a small label indicating what the button does appears, and it also reminds us the keyboard shortcuts to avoid going each time to the box or to the menu. The appearance of the box when beginning to digitize is configurable from MiraMon.par (key MostrarBarraEinesDigit= from the [MiraMon] section) and it can dynamically set to appear/disappear from the “Edit | Show the Digitize / Edit tool bar”. ***The box title shows the current attribute*** (or the length that allows the box size preceded by the abbreviation "Art:"; when there is more than one attribute (structured vectors) it shows the content of filled non-geotopological fields, separated by one space; if multiple records are being introduced, it uses the same criteria, but preceding the contents of each record by the abbreviation "[R#]", where # is the registration number, starting from 1.

From left to right and top to bottom:

- End digitizing/editing -> F2
- Undo -> Ctrl+Z
- Unnail last vertex / Cancel command -> BKSPACE
- Connect whenever possible -> F3
- Connect to end vertex -> F3
- Connect to preexisting vertex -> F3
- Connect to new vertex on segment -> F3
- Close polygon -> F3
- End object -> Right button
- Change digitizing attribute -> F4
- Copy object and attribute -> Ctrl+K
- Copy object (current attribute) -> Ctrl+C
- Highlight copied objects
- Coordinate entry via keyboard
- Options for digitizing vectors ...
- Show vertices -> Ctrl+F2
- Break arc /line in vertex -> Ctrl+F3
- Break arc/line -> Ctrl+Shift+F3
- Join consecutive arcs/lines -> Ctrl+U
- Eliminate vertices -> Ctrl+E
- Insert vertex -> Ctrl+I
- Move vertex -> Ctrl+M
- Move / edited vertex by coordinate -> Ctrl+W
- Change arc/line direction -> Ctrl+S
- Change object attribute -> Ctrl+F4
- Delete object -> Del

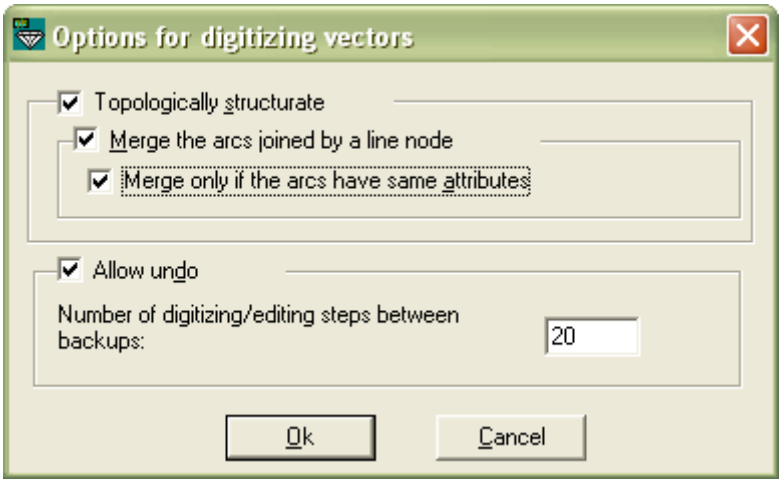
7.4 Undo any operation

This command allows undoing any operation done both on the graphics and on the alphanumeric. All the transactions done from the beginning of the digitizing session can be undone. The undo command can be applied on unstructured and structured files and, in the latter case; it works whether it is being digitized with topology control or without control. This new feature uses the keyboard shortcut Ctrl+Z.



In this sense, two new buttons have been added to the digitizing/editing toolbar:

- A button that allows undoing any digitizing/editing command 
- A button that allows calling the same box that was already accessible from the "Edit | Options for digitizing vectors ..." 



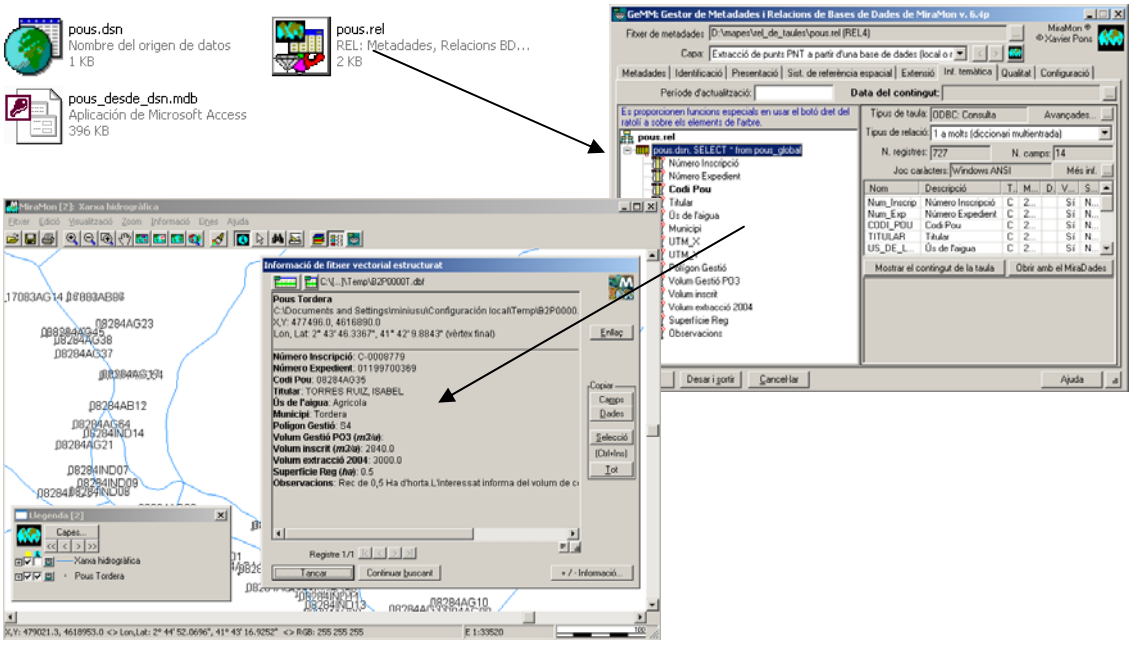
8. New applications and a selection of improved aspects in some modules

8.1 AdapRAS

It's a new module that adapts a raster to the geometry of another raster by performing the needed transformations hitherto dispersed in Retalla, Mosaic (when enlarging an area with NODATA), DensRas and CanviPrj. Naturally, these modules will continue to exist to be used individually for the purpose for which they were created.

8.2 BDPNT

Several settings have been done to support the legacy of REL with n levels when starting from a DBF from a command line, whether it is indicated the entity identifier field or not.



8.3 BMPIMG

Import/export program between IMG and BMP files, which may be invoked independently as had been done to date, saving it from the graphical environment of MM32.

8.4 BufDist

It has been added the possibility to ***generate buffers and distance maps on layers from an ArcSDE layer,*** either on a REL file conveniently generated or on an SDS file. One may also choose the output ambit from an ArcSDE layer.

8.5 CalcIMG

It is incorporated the ***calculation*** capacity ***over layers from an ArcSDE layer,*** either on a REL file conveniently generated, or on an SDS file. It can also be chosen the output ambit from an ArcSDE layer.

8.6 CombiCAP

It is incorporated the capacity of combining ***layers from ArcSDE layer,*** either on a REL file conveniently generated, or on an SDS file. It can also be chosen the output ambit from an ArcSDE layer.

It is provided ***3 new statistics, First Quartile, Median and Third Quartile,*** in the Combination type POL+IMG -> POL with IMG statistics.

8.7 Automatic Geometric Correction of Images

Toolset in development that are going to be distributed during the v. 7:

PCMDE: A program to generate control points for geometric correction using a DEM expressed in XYZ dimensions in TXT format. The points are generated in equal number in each altitudinal interval and divided between the X and Y ranges of each altitudinal interval.

TriaPC: It performs a first degree polynomial correction based on choosing the most appropriate homologous points, previously located in a pattern image and identified in a problem image.

CercaRot: It allows, from a pattern image and some identified points on it, the approximate location of these points in a problem image presumably rotated respect to the pattern image.

AfinaPC: It allows locating identified and located points from a reference image into a problem image; the search is done through window displacements around control points, of an image respect to the other.

8.8 DGNMM

Following the detailed conversion of all the official topographic maps of Catalonia into MiraMon format and into different scales in order to be distributed by the Institut Cartogràfic de Catalunya, the module has been improved and sophisticated in many aspects, for example, with the incorporation of text symbolization capabilities.

8.9 Several improvements on geometry and geodesy

Continuous developments of formulas for several reference systems that can be found in the corresponding drop-down menu have been implemented. It has to be highlighted the "***Mercator-Popular-Visualisation-Sphere***" which is being used by Google Maps and other virtual globes environments. This system is also known as ***"Web Mercator"*** and as ***"EPSG: 3785".***

8.10 DXFVEC

It has been added the option 6 that generates a MMM with all the information contained on DXF files which becomes the default option and, therefore, the previously existing options to generate VEC, are now relegated to the options of Selection by entity type.

8.11 ErrorMDT

This new module searches locations in a Digital Terrain Model (DTM) that contain values likely to be considered as errors.

The program compares the value of each cell with the result of a local interpolation of its 4 or 8 neighbours. If this difference is high, greater than the indicated t-Student, they are flagged as a suspicious location error. The program generates a model with differences in each pixel and a vector of unstructured points with the locations that may possibly be erroneous. It can also generate a text file report containing the list of these candidates.

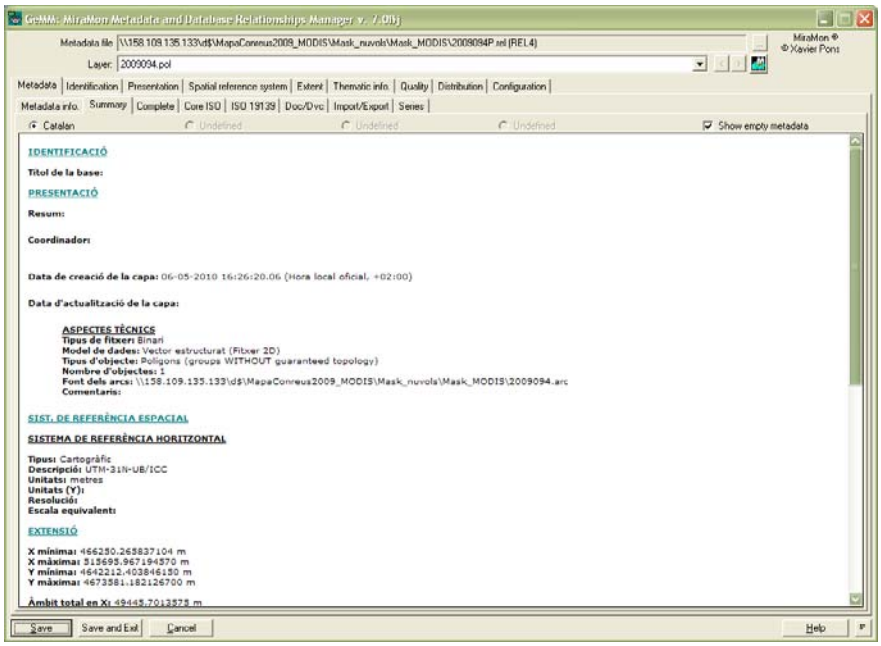
8.12 MiraMon Metadata and Database Relationships Manager (GeMM)

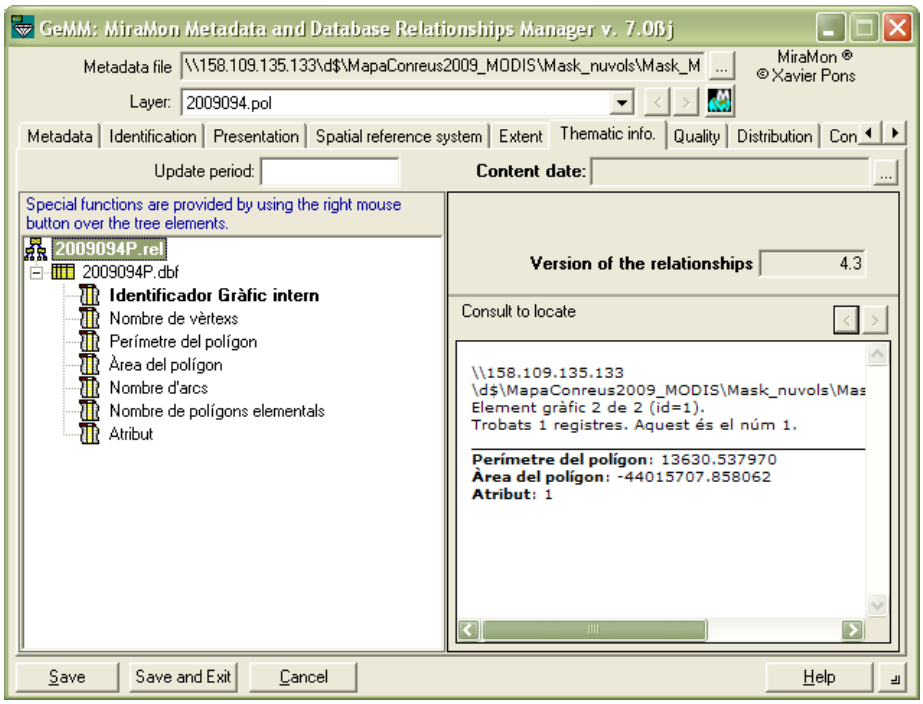
As mentioned in other sections, new formats of geographic information sets can have metadata documentation with all the GeMM benefits (BMP, ECW, etc).

Support to new raster formats. GeMM allows managing the metadata formats ECW, GIF-GFW, PNG-PGW, JP2-J2W, J2C-JCW, SID-SDW and BMP- BPW, besides the traditional TIF-TFW or TIFW and JPG-JGW or JPGW. If any of these files has no REL, the program tries to read the coordinates of the appropriate "world" file and, if it exists, it loads the Horizontal Reference System set by default on MiraMon.par and it is then set by default in the REL. Full support is given to B.rel as metadata file for BMP. Now the BMP may be viewed fully georeferencied, etc. This incorporation is especially interesting because in case that a 24-bit uncompressed format is desired, internal BMP format allows the fastest Windows display.

Enhancement of the metadata of the WMS views saved. It is included a process that informs of the WMS request that has generated the saved view. It is allowed opening the metadata of a GIF (I.rel), typically coming from a stored WMS view, etc.

New embedded resource of "Internet Explorer" type. It is incorporated to the metadata view and to the “Thematic information" (search by location) tabs. This allows a more comfortable visualization of HTML format views (including the database structure in a full view, not available, till now, without HTML export) including images, tables, links, etc.

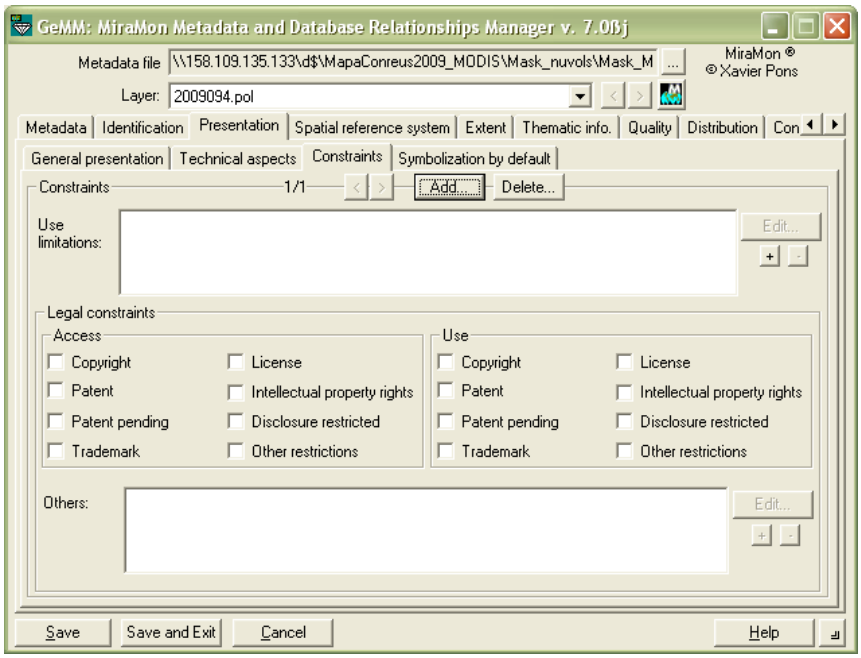




New sub tab in "Metadata" tab to view the XML 19139 export. Work has been done to support increasingly optional entries of the adopted standards during this time, assuming that the binding options are already available. It has been completed with the metadata display of the Vertical Reference System, the ISO 19139 export according to the profiles, an indication regarding the rasters' content type, etc.

New "Constraints" sub tab in the "Presentation" tab. Until now, only one limitation could be documented referring the use of the data. Now, this has been expanded to meet the INSPIRE directive and the ISO 19115. It is possible to

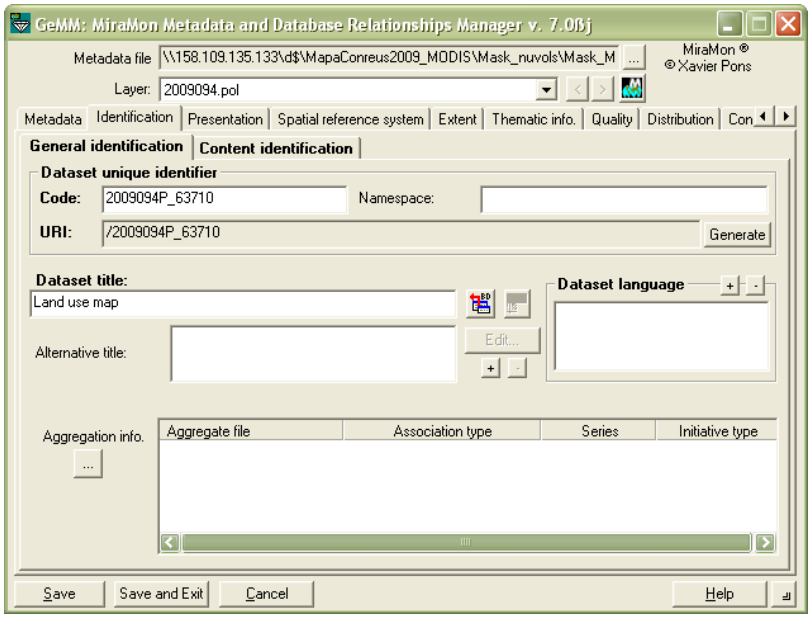
document as many constraints as necessary, for each constraint n use limitations may be indicated as well as the legal restrictions on use access.



INSPIRE export template, which follows the specifications of the "Metadata Implementing Rules" of INSPIRE.

"Dataset unique identifier". This identifier has been included into the Identification tab, which has been divided into two, "General identification" and "Content identification". The dataset unique identifier is formed by two fields:

- Data code identifier, for example the address of the metadata file, or a unique code identifier.
- Namespace, typically the URL of the distributor.



To facilitate the documentation of this field, the program includes a button that automatically generates this identifier.

Export metadata in XML format. To date, it was possible to define in the REL two export files of metadata, in HTML format, that could be updated automatically when saving the metadata. Now, it is also possible to save two XML files of metadata.

Export of metadata by command line to facilitate the new XML ISO 19139 IDEC template. See technical document ***Exportacio_GeMM_ISO19139IDEC_vx*** for more details.

New layout tab. It has been implemented a new tab in GeMM called "Distribution", which allows documenting the data distribution information, such as who and how are data distributed. The design of this tab has been done following the ISO 19115 metadata standards, the INSPIRE guidelines, and considering the needs of our users.

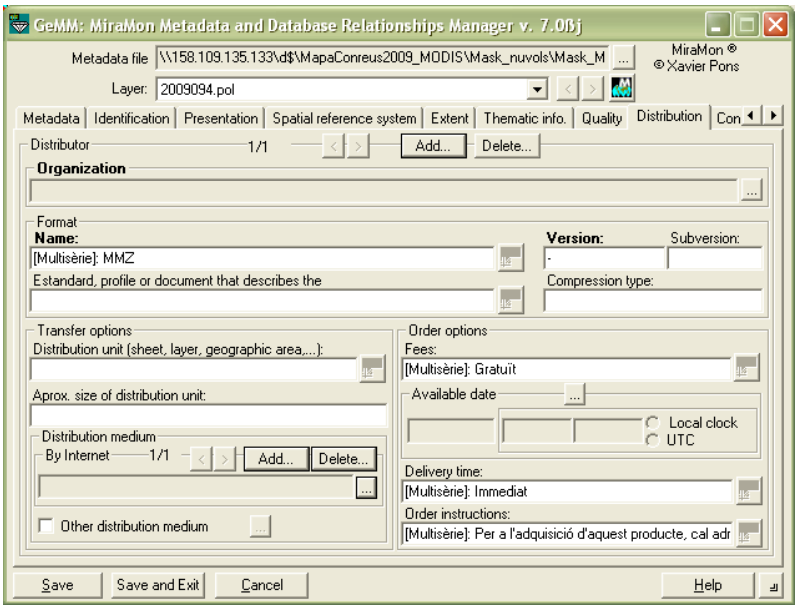
Based on this, a dataset can be distributed by various distributors in different ways. Therefore, from this tab one may document as many distributors as needed.

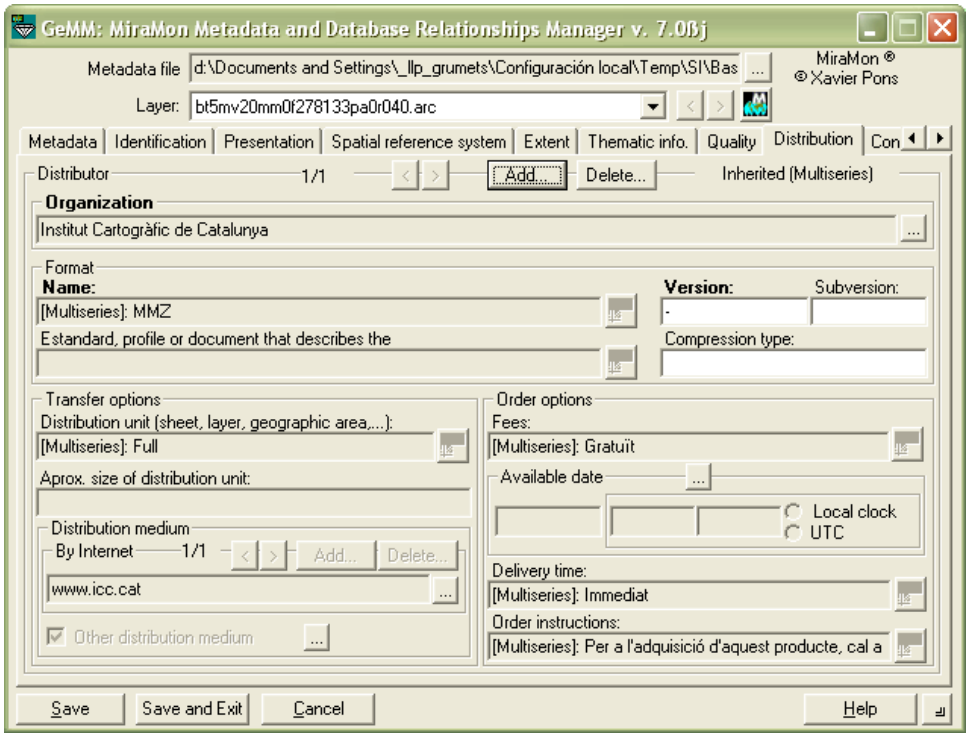
For each distributor it will be documented:

- The organization own data such as the name of the organization, the contact information or the URL address.
- The data distribution format.
- Transfer options, e.g., the distribution unit, the size of the unit and transfer ways (Internet or other such as a CD).
- Command options, e.g., data availability, prices, deadline delivery, ...

Any information that is described by a text can be defined in several languages, as it is usually done in GeMM.

The content of the distribution tab may be inherited when necessary. The inheritance in this case, is given in terms of the distributor. A common case arises in map series, where every sheet is usually distributed in the same way. Since inheritance is at distributor level, it could be included if necessary, for example, a new distributor for a particular sheet.





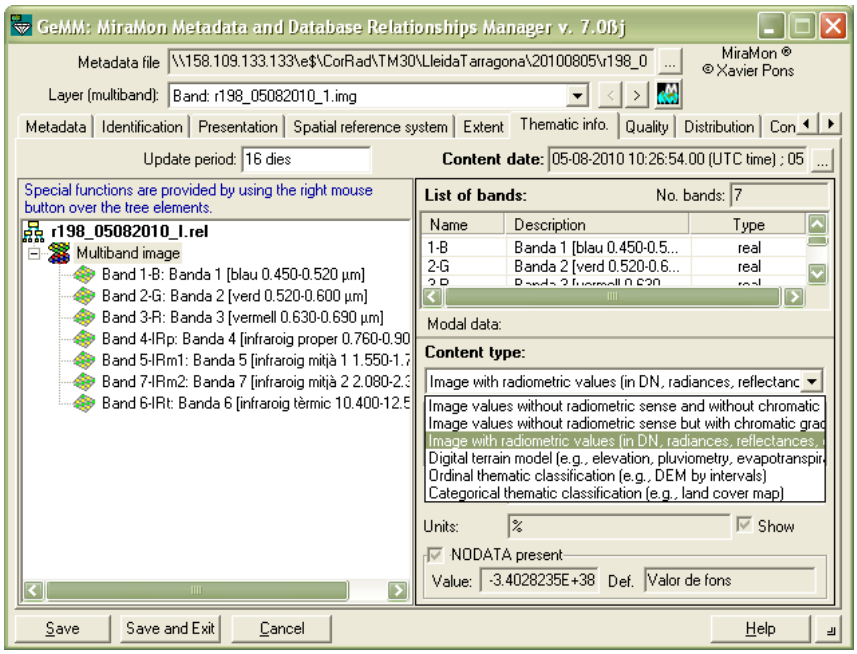
Extending the raster's content type, in order to differentiate the old "Image without radiometric values (e.g., scanned aerial photography)" in two new values: "Image without radiometric sense and without chromatic gradation" (e.g., scanned map to 256 colours) and "Images without radiometric values sense but with chromatic gradation" (e.g., B & W scanned aerial photography). The new default value is now the first mentioned above. The two new values correspond now to types "general" of "image" for ISO 19115, which only allows this value physicalMeasurement and thematicClassification. ***Hence, this continues along the line to offer, in MiraMon, better-provided metadata than the standard ones when this is inadequate, but maintaining a consistent export towards the standard when requesting ISO view or export.***

This value is unique for the entire multiband and can take, according to ISO, the following values (following the two points, there is the description that ISO gives for each value)

- Image: Significant numerical representation of a physical parameter that is not the actual value of the physical parameter.
- Thematic classification: Code value with no quantitative meaning, used to represent a physical quantity.
- Physical measurement: Value in physical units from the quantity that is being measured.

ISO's distinctions have seemed to us unclear and little appropriate, especially considering the descriptions for each type. For example, what happens when an image has a radiometric value? The radiometric value is a physical parameter and therefore, according to ISO, which of the two options must be chosen, image or physical parameter? This is why GeMM allows defining more metadata values for this entry, some of which end up converging to the same value in ISO when exporting. The values that can be documented in GEMM are:

- Image without radiometric value (e.g., scanned aerial photography). Exported as "Image".
- Image with radiometric value (in DN, radiances, reflectances, etc). Exported as "Physical measurement".
- Digital terrain model (e.g., elevation, pluviometry, evaporation, pollution, etc). Exported as "Physical measurement".
- "Ordinal thematic classification (e.g., DEM by intervals). Exported as "Thematic classification".
- Categorical thematic classification (e.g., land cover map). Exported as "Thematic classification".



Inclusion of all GEMET keywords. INSPIRE requires to document for any layer some keywords from the GEMET thesaurus (http://www.eionet.europa.eu/gemet). All the keywords of this thesaurus have been downloaded and incorporated into the thesaurus m_kw.dbf as a third type. It is still pending to translate it into Catalan, since they weren't in the original database. At the moment, the Catalan field is being filled in with Spanish words. Remember that, additionally, the MiraMon offers a collection of many thousands of keywords, ranked by subject, thanks to the Collective Catalogue of the Universities of Catalonia (CCUC).

Suggested texts in GeMM. In the context of an organization, the content of some metadata text fields is repeated many times within a layer (e.g., a specific organization can be the publisher, the creator, the distributor,...) or between different layers (e.g., the summary of the content between sheets of a map series).

To avoid typing the same content many times and ensure that it is always written in the same way, it has been ***designed and implemented a system to choose the content of the field to be filled in from a list of suggested texts***, while still maintaining the option to edit it freely when necessary.

The user chooses a text from a suggested list, so its contents will be used to fill in the fields; these can be freely modified, since the link between the suggested text and the metadata fields is not kept.

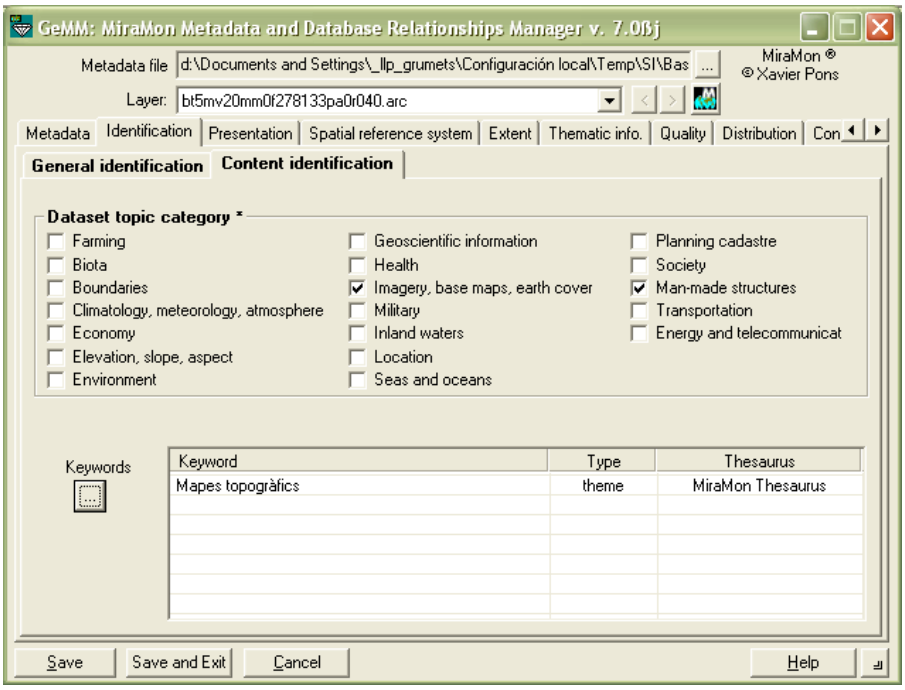
Suggested texts are stored in a dictionary or thesaurus, which is a text file type in INI format, called "U_SUGG_MD.ini". This file follows a nomenclature of sections and keys similar to the metadata and relationships file (REL), and it contains a list, multilanguage when necessary, of the field's possible values with suggested texts.

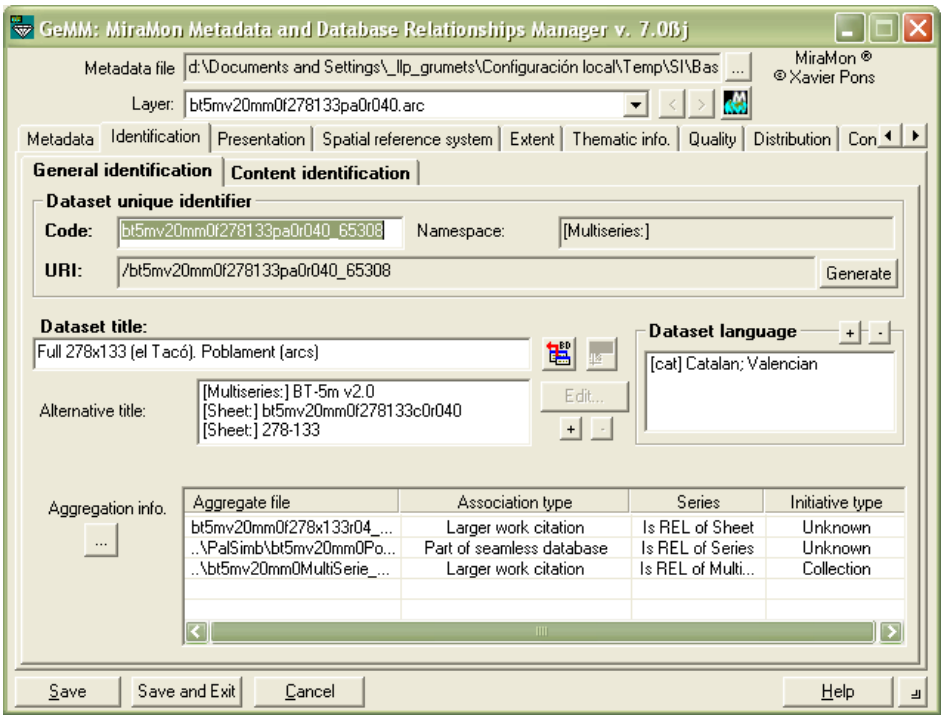
This is a specific file for each corporation which is located in the server directory where the MM32 is installed. Eventually, it can also be used at individual user level.

The dictionary file allows easy editing in any text editor in a format known by our users, and has no limitations on the number of characters that a field can contain (on the contrary, DBF is limited to 255 characters per field). This is a reading file only, where the administrator is the one who will be editing and filling in manually the contents of the dictionary, following the nomenclature specifications in the following section.

Among all metadata fields, it has been chosen a subset of text type, in which usually occur more repetitions in content, and therefore, where it is more interesting to have the option of suggested texts.

Each of the fields is specified by a section and by a key that can have N repetitions and that can be multilanguage, if the field content is also multilanguage.



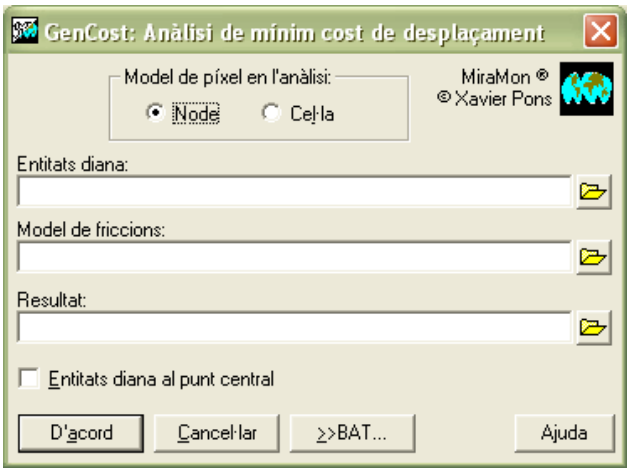


For more information about the texts suggested in the GeMM and about how to specify the fields that can be incorporated in the dictionary, you can request the document ***TextosSuggeritsGEMM_vx*** to suport@miramon.uab.cat .

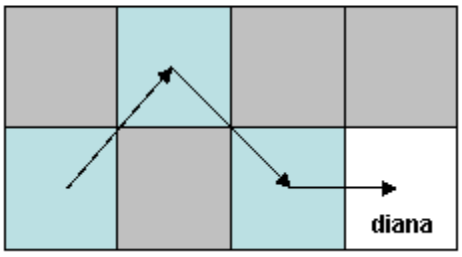
8.13 GenCost

This module analyzes the least cost of path over a friction model. To this end, the module creates a raster of costs from the mentioned friction model (which acts as resistance to the pass like an impedance surface) and from a raster of target entities (which are to be reached). The search algorithm of the

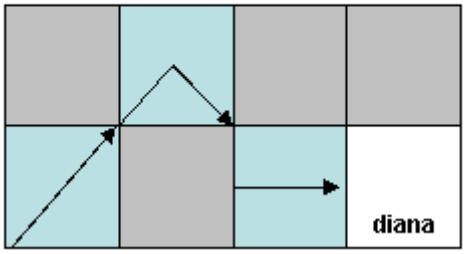
accumulated least cost is a MiraMon own version of **Dijkstra's Algoritm** (Dijkstra, 1959).



Node analysis mode



Cell analysis mode



Two models of raster treatment are supported: node mode and cell mode. In both models the blue areas are low friction and the grey areas high friction.

8.14 GestBD

Several new options for this powerful tool of table and database manager are created, such as:

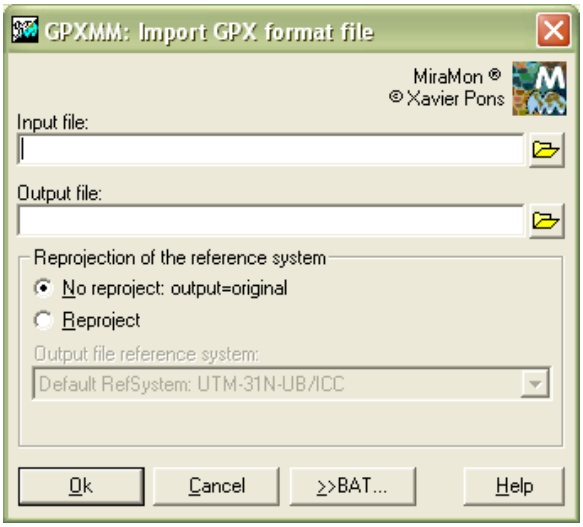
- It has been added the COMPLETA_JOIN_1_A_N (23) option to complete the table with the values that may be missing when reviewing a JOIN 1 to N between the table and a thesaurus, from the key fields that make the link and the unfilled fields. Once established the JOIN between the two tables, it is checked if the field values that are need to be completed from the thesaurus are present in the table, and if they aren't, they are incorporated as records for that specific graphic identifier.
- Certain SQL queries with important requirements of memory (return of a large table, of tens of megabytes) could lead the PAS_DE_ODBC_A_DBF (3) option to be out of memory. It has been changed the memory management of this module option and it has been checked that it supports larger queries.

8.15 GestTop

This new module is created as a set of tools and vector features for, mainly (but not only) structured formats and topological procedures. This first version has two uses: TRUNCAZ, which transforms a 3D vector into a 2D vector, and UNIO_OBJECTES_VEC, which merges adjacent objects from an arc or polygon VEC file.

8.16 GPXMM

It's a new application for importing GPX files that come from a GPS to MM. It incorporates an integrated change of the horizontal reference system.



8.17 number signllum

It is a new option to use a DEM of higher resolution than the resolution of the illumination model generated. In this new case, the algorithm for calculating the normal vector to the field depending on the neighbour pixels is changed for a polynomial fit (1st, 2nd or 3rd degree) for each pixel, resulting ***from the altimetry values inside the pixel provided by the DEM of higher resolution.***

8.18 Insoldia

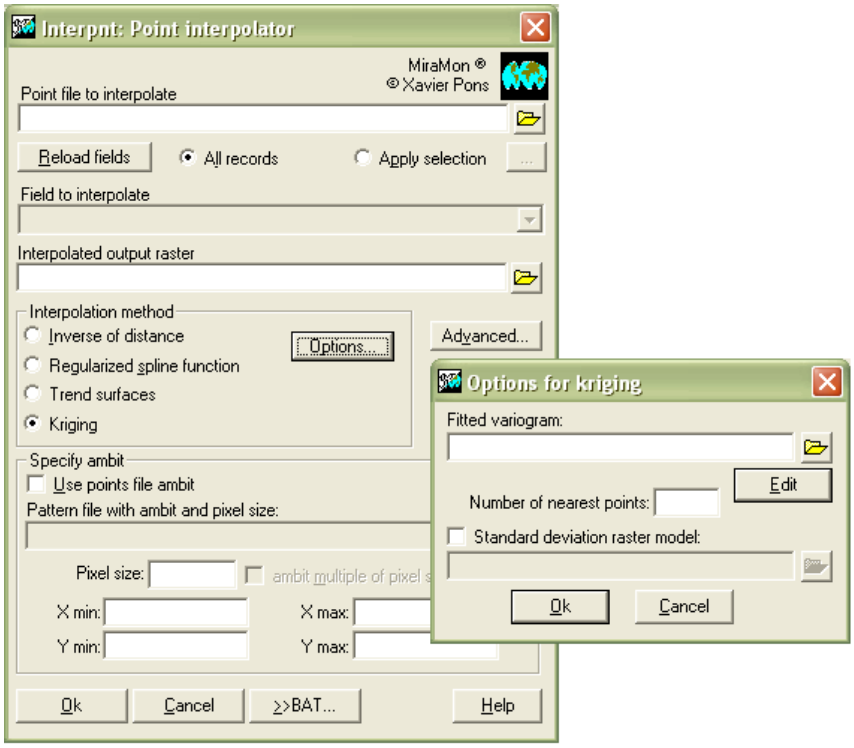
It has been added to the application the possibility to calculate the solar radiation of a current day, month and/or year (depending on the CPU) indicating in the day, month and year parameters a number sign (#) instead of a number. This is useful for automated tasks that have to run every day and in which can be complex for some users to get the current day in the BAT.

8.19 InterPNT

The new kriging option of the **InterPNT** reads this **VAM** format and uses it to generate:

- The raster of the prediction model
- The raster of the errors model.

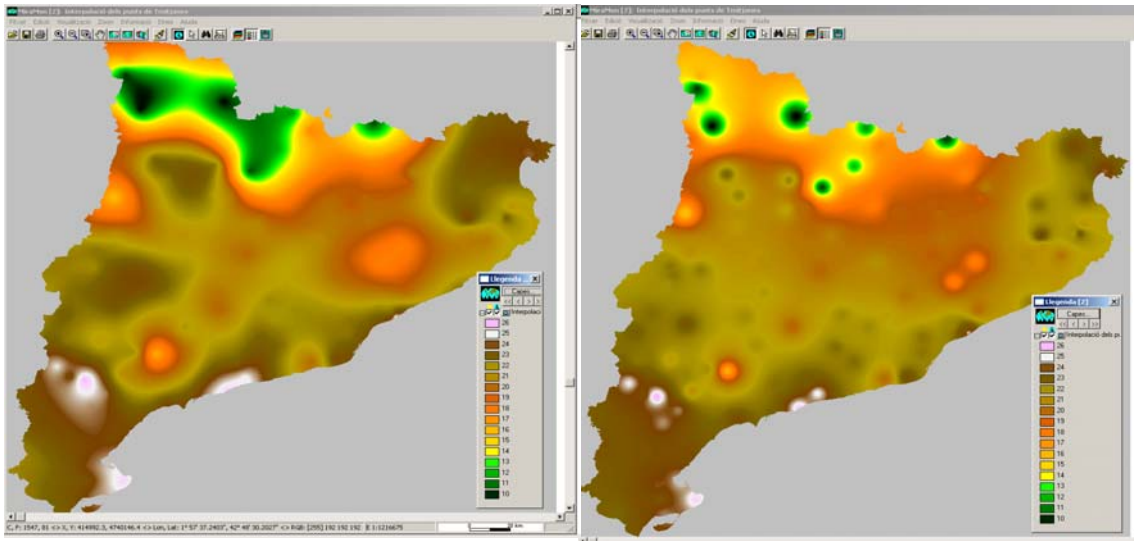
From the different kriging types, in the **InterPNT** has been implemented the **ordinary** kriging, although it is also possible to obtain a **residual** kriging; certainly, it should be noted that combining other modules of MiraMon it is also possible to generate a **residual** kriging with regard to a trend surface (with the own InterPNT) or with regard to a multivariate-regression (RegMult module).



Although kriging is usually a procedure demanding computing time, an optimization effort has been made in MiraMon to considerably reduce the execution time when it is wanted that the data participating in the outcome of each interpolated pixel are the same (the whole group is the most common case). Some software require a maximum number of samples (the nearest ones to the problem pixel) to reduce the computing time, which has also been implemented to MiraMon, but it has to be kept in mind that this may generate discontinuities in the result.

This effort reduces the usual huge difference in computing time needed compared with a simple model such as the inverse of the weighted distance (IWD) and, even though the kriging implementation has still a higher duration, it can be a minor inconvenience if taken into account the comparison of the quality of the results that in some cases is obtained.

Digital errors model. This calculation allows generating, for each interpolated pixel, the error estimated by the model. The generation of this layer leads to a multiband raster (interpolated band + error band).



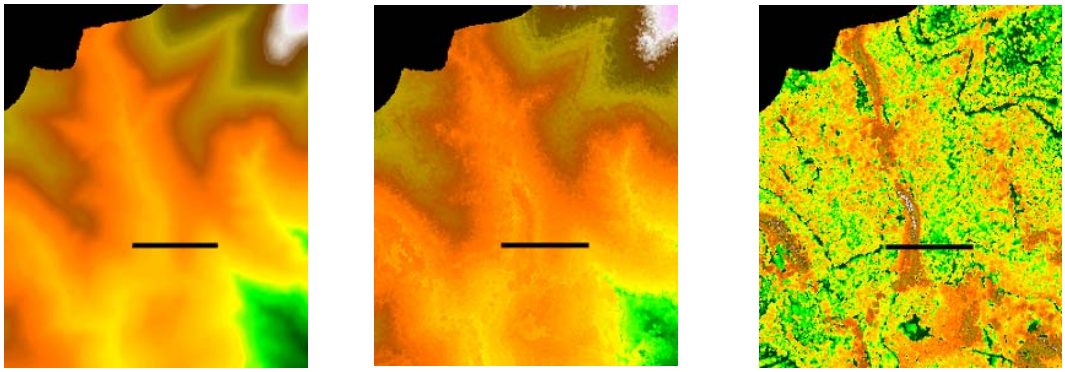
Example: On the left ordinary kriging. On the right IDW.

NOTE: If you wish to view some of the theoretical foundations on Kriging, you can request the CursKriging.pdf small introductory document, which corresponds to a presentation performed in an introductory course held by the CREAF, before the development of the module just explained.

8.20 LASPNT

It is an importing program from LAS files (Lidar type laser, very useful for detailed relief, etc) to PNT of MiraMon.

These files are composed of many dots (laser rebounds) storing various attributes. These points are classified into several categories: terrain, buildings, medium vegetation, high vegetation, etc. Once the interest points are selected, they can be interpolated to generate digital terrain models (DTM), surface (DSM) and altitude models by subtracting the previous two as seen in the following figures:

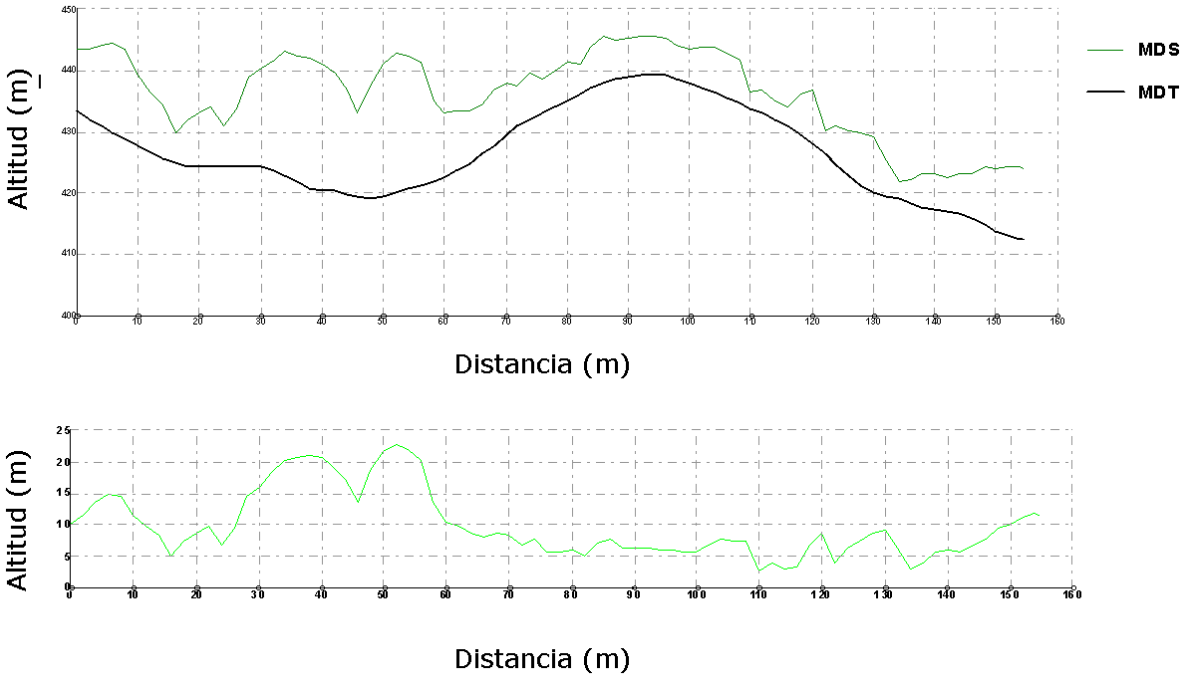


When generating a profile, it can be seen that, in this case, the tallest trees are the ones in the valley (riparian forest):

8.21 LinArc, Ciclar, AtriTop

Ciclar:

Two new modes have been incorporated to Ciclar, which allow ***direct conversion from polygon VEC files to POL files*** (with groups of non topological polygons), and from POL files to polygon VEC files. It has also been



solved small errors from the command line application as well as from the window application.

It has also been added the possibility to save the original area of the grouped polygons when cycling. This area will be called 'partial area'. It can also be added a field with the partial area as a percentage of the total area. The new parameters are /CAMP_AREA= (options 3, 4 and 5), indicating the new field name that will contain the partial area results for each record of the resulting polygons when multiple register occurs (this field will allow determining the area occupied by each record before merging the polygons; in the absence of this filed, the program creates it) and /CAMP_AREA_TPERCENT= (options 3, 4 and 5), indicating that a field has to be generated with the coating percentage for each register from the eventual multiple entries of the attributes principal table.

LinArc:

It is incorporated the layer of nodes and its associated files in operations of transferring attributes for a particular case where its generation was omitted:

when transferring polygons to arcs with the resulting layer different to the receptor one.

A new option is included in LinArc to **merge pairs of arcs that share a node,** while no other arc coincides in that node. This operation doesn't perform a topological structure (it doesn't break arcs, or makes new connections, etc). This is the most convenient operation to import other file formats that have limitations on the number of vertices per object, and that are forced to make more than one object per strip of vertices; nearly having no limitations in MiraMon regarding the number of vertices per arc, it is conceptually better to merge the adjacent arcs, since a conventional built could generate unwanted intersections (i.e., two level roads that will become a level crossing). Simultaneously, LinArc is allowed to transform **from ARC to unstructured ARC,** which is useful in generating road networks files keeping bridges that have actually no connectivity.

Likewise, it is consolidated the selective re-cycling of adjacent nodes and it performs the "**non topological groups cycling" from arcs with the same attribute,** which becomes the attribute of the polygons group and it is supported the creation of **non topological groups with holes from ARC files that have been topologically structured** (i.e., if a line was both an inside edge of a polygon (hole) and an outer edge of another, the ARC file will have two entries); the attribute of the arc becomes the attribute of the polygon.

AtriTop:

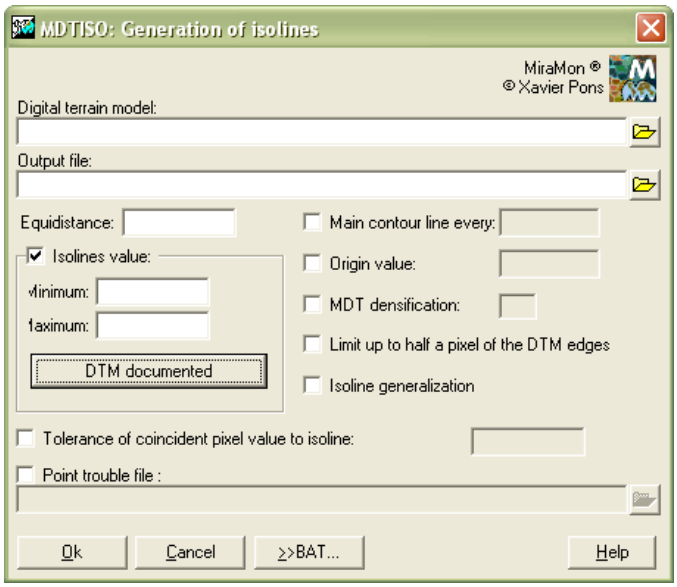
Finally, AtriTop adds the **transfer** option **from PNT to NOD for geographical proximity criteria.** There is an optional parameter of threshold transfer distance and, in this case, this may create new nodes if necessary (in pre-existing vertices or creating new vertices when needed), always provided within this threshold. The distance between the recipient node and the PNT donor is also documented in a database field.

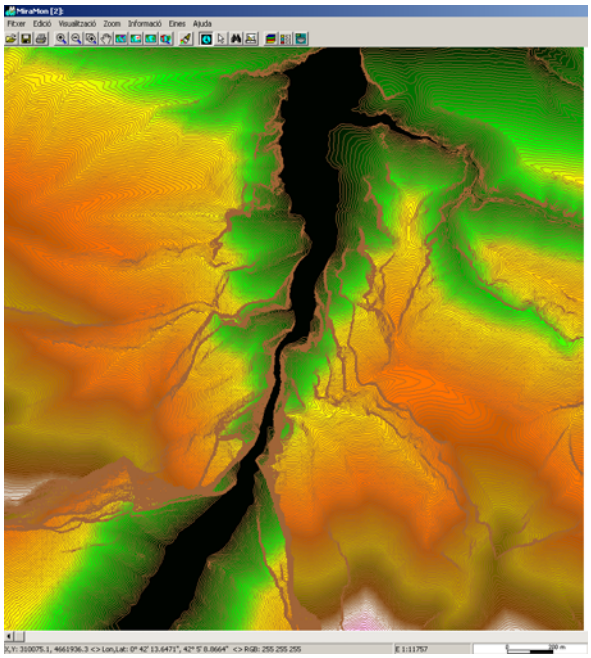
8.22 MDTIso

This module allows generating contour lines from a digital terrain model (DTM) (i.e., elevation, pluviometry, evaporation, contamination, etc). The algorithm internally works in three phases: generation of points that will be the vertices of future isolines, indexing points and contour line generation.

Options available:

- Densification of the DTM
- Generation of isolines
- Addition of tolerance to coincident elevation value cells to an isoline
- Assignment of a minimum and maximum elevation value of contour line.
- Creation of a file on problem points, if there are.





Be aware of the following features:

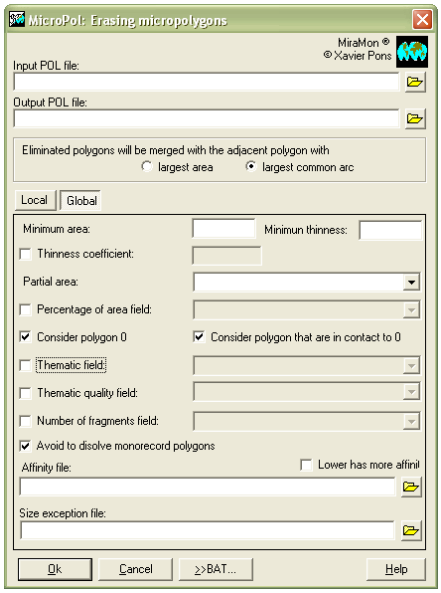
- The option to make coating between map sheets.
- Assignment of a Z base value.
- Assignment of symbols to primary and secondary curves.

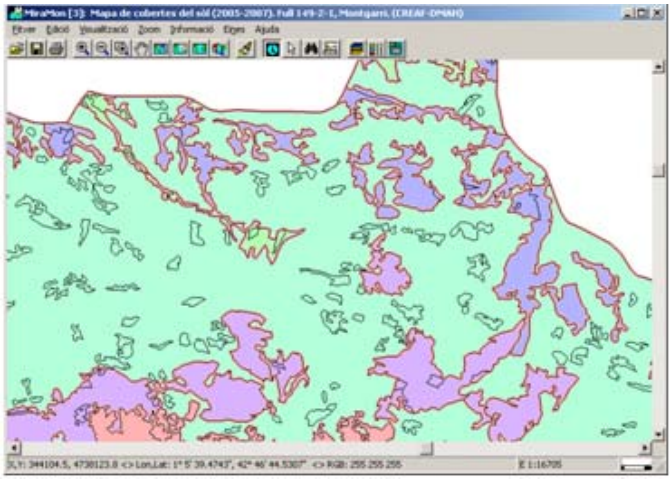
8.23 MicroPol

Along the line with the improvements in cartographic generalization, it is now possible to add arcs to define independent areas within other areas, as well as assigning attributes to the arcs and declare them "protected" from the generalization (the adjacent polygons to this particular arc may never be merged). This allows merging polygons between them, and thus generating

large polygons, before they are absorbed by the background matrix (allowing small islands to group). See the module help for details.

Various improvements have been made to cartographic generalization: now by default, the program tries to avoid merging polygons by an arc considered narrow, leaving this situation as the last alternative. If the /FONDRE_PER_ARC_ESTRET parameter is indicated, the narrow arcs are then considered equal to the others for merging polygons, unless the arcs were created during the polygon fragmentation. It has also been solved an issue of inconsistency in percentages in the table of polygons' area.





It is included an overall generalization that allows to use the same tool to generalize a polygon map based on the criteria of minimum area and minimum polygon width. This allows transforming a map of polygons at a certain scale to a lower scale map.

8.24 MiraDades

- It has been generated a ***version for MiraMon Mobile on PDA.***
- It has been incorporated, into the "View" and "Fields" menu, as well as in the contextual features box, the fields displayed when clicking on the field name, the new ***"Field view width ..."*** option, which allows specifying the desired width for a certain field in approximated characters. The width is approximated since in the font used by MiraDades, an "M", for example, is wider than a "1". It is supported a width between 0 (the field is reduced to about 7 pixels, enough for the button field to be still easily accessible) and 255 characters, remember that through "View | Show Hidden Fields" can be indicated that the fields declared not visible are not shown at all (in this case, there will not be any trace of the presence of the field). In the REL file of the table, if it is a modern REL (REL4), the width is stored in a AmpleVisualitzacio= key of the corresponding field section (i.e., [TAULA_PRINCIPAL: ID_GRAFIC]); during the reading of the REL, if there is no key, it is applied the

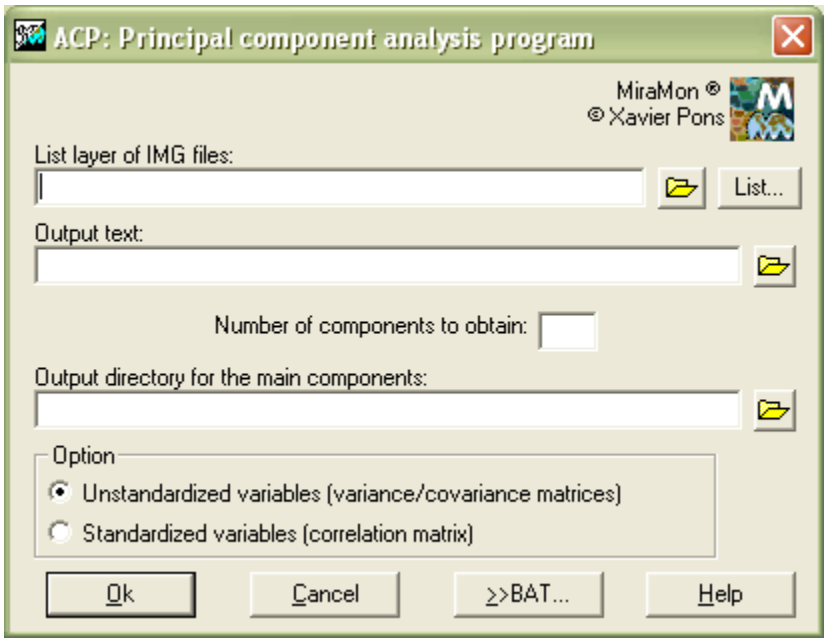
traditional criteria of the MiraDades, which allows the descriptor, the field name, as well as a full field to be readable. When closing a table, if the user has modified the width of a field and it is a REL4, the user is offered to save this feature, which is also saved when there have been changes in the structure or in the properties of the table (for example, when modifying the descriptor).

- ***It now appears, in the header of the column that displays the name or descriptor of the field, their units.*** Units are shown in parenthesis after the name or the descriptor, except when indicated in the metadata not to display the units, or when units don't exist, or when they are empty or unknown.
- The ***"File | Save As ..."*** option is no longer restricted to open tables via ODBC and it is now extended to DBF files. This allows saving ***an open DBF under another name.*** Besides being useful as a DBF tables replicator, this functionality is necessary for some users in corporate environments that have restricted "normal" access (with the explorer) to some directories (such as %temp%) but, instead, the software can access it, like in the case of the single table: with the new functionality is very easy to copy one table to another location, when you want to keep it, work on it, etc.

8.25 New remote sensing tools

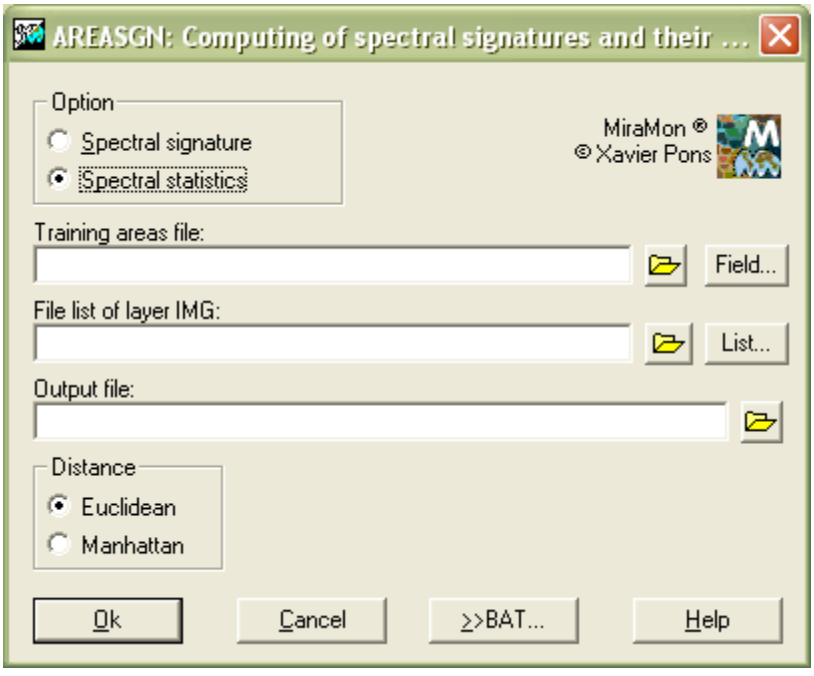
ACP

The Principal Component Analysis is an important tool for multivariate statistical processing, especially applied in the field of Remote Sensing, for example when you want to reduce the dimensionality of data, often with highly correlated variables that take advantage of the PCA. The implementation of MiraMon has some outstanding features, such as the double precision calculation that allows a robust behaviour, even in highly correlated cases, as often occurs in hyperspectral Remote Sensing, or the proper processing of pixels with NODATA values, without having to provide masks using external files.



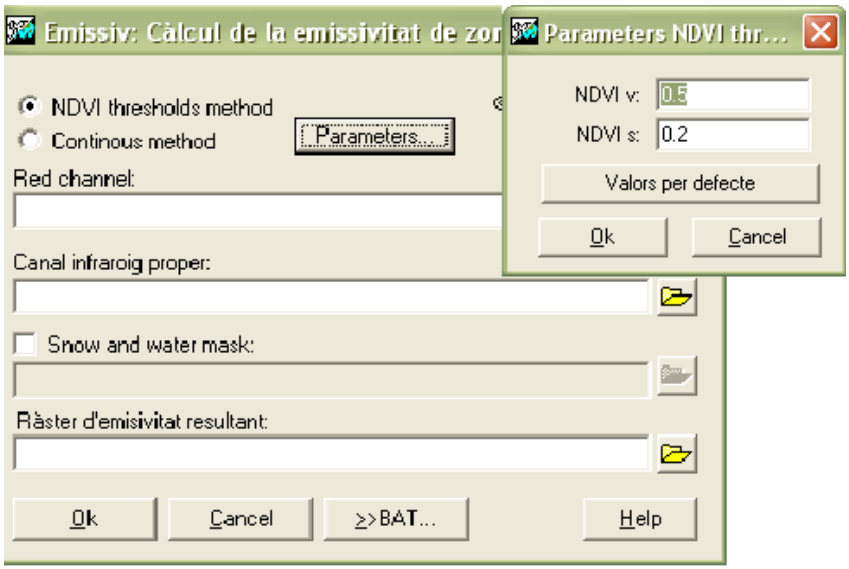
AreaSgn

This new module allows the calculation of spectral signatures and spectral statistics from the files that the classification modules of MiraMon generate (i.e., files that are generated by the IsoMM application for each feature). This is an important tool for the professional processing of image classification, aimed at obtaining categorical thematic cartography in the field of Remote Sensing, allowing not only to know about typical statistics such as the average, etc, but also distances between classes (Euclidean, Manhattan, Divergence, Transformed divergence, etc), thus allowing a higher control of the multivariate statistical process of classification.



Emissiv

It allows calculating the emissivity from a Landsat type image.

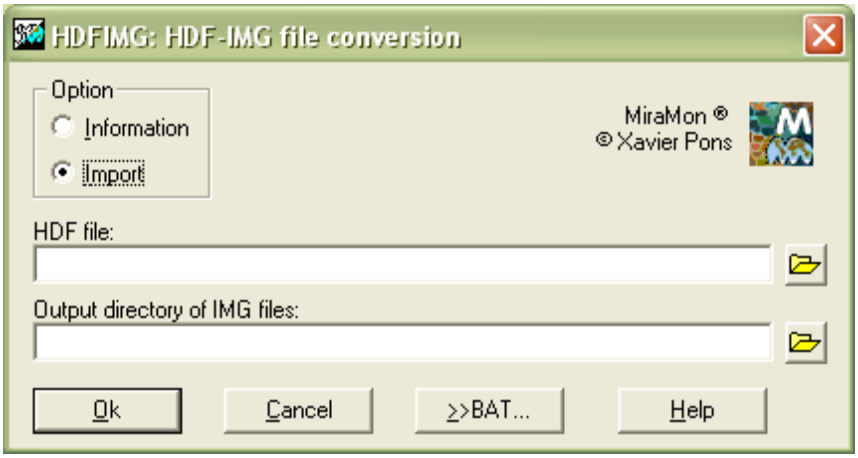


Histo

It allows obtaining the graphic histogram of frequency of a raster values based on classes defined by the user.

HDFIMG

It's an importing program of HDF4 files to IMG raster format.



The products currently developed are:

- ASTER
  - ASTER 3A1.
  - ASTER L1B.
- MODIS:
  - MODIS Calibrated Radiance 5-Min 500m (MOD02HKM/MYD02HKM)
  - Calibrated Radiance MODIS 1km 5-Min (MOD021KM/MYD021KM)
  - MODIS Geolocation Data Set (MOD03/MYD03)
  - Daily MODIS 500m 8 Day Surface reflectance (MOD09A1/MYD09A1)
  - MODIS Daily Surface reflectance 500m/1km (MOD09GA/MYD09GA)
  - MODIS Daily Surface reflectance 250m (MOD09GQ/MYD09GQ)
  - Surface reflectance MODIS 250m 8 Day (MOD09Q1/MYD09Q1)
  - 500m MODIS Daily Snow Cover (MOD10A1/MYD10A1)
  - MODIS Snow Cover 8-Day 500m (MOD10A2/MYD10A2)
  - MODIS Snow Cover Monthly Global 5km (MOD10CM)
  - MODIS Land Surface Temperature Daily 1km (MOD11A1/MYD11A1)
  - MODIS Land Surface Temperature Daily 6km (MOD11B1/MYD11B1)
  - MODIS Land Cover Type Yearly 1000m (MOD12Q1)
  - 500m MODIS Vegetation Indices 16 Day (MOD13A1/MYD13A1)
  - MODIS Thermal Anomalies & Fire 1000m Day 8 (MOD14A2/MYD14A2)
  - Monthly 500m MODIS burned area (MCD45A1)
  - MODIS 500m Vegetation Conversion Yearly (MOD44B)
  - MODIS LAI and FPAR 8 Day 1km (MOD15A2/MYD15A2)
  - MODIS Gross Primary Productivity 8 Day 1km (MOD17A2/MYD17A2)
- NASA Ocean Products
  - NASA Ocean Color Products L3SMI (MODIS, SeaWiFS, OCTS, CZCS)

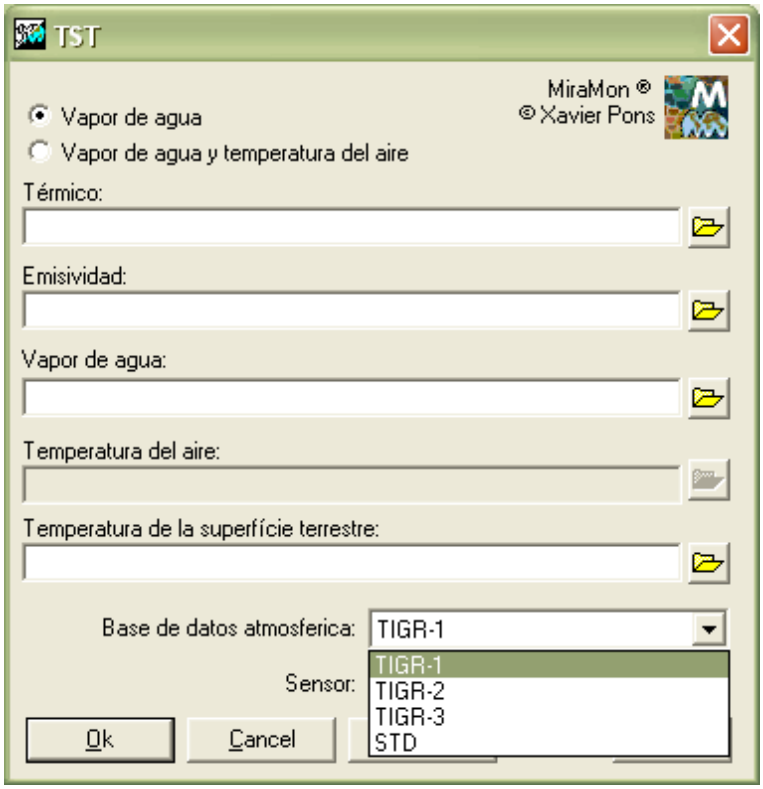
    - NASA Ocean Productivity Products (MODIS, SeaWiFS)
- CHRIS Proba
    - CHRIS Proba Mode (1)
    - CHRIS Proba mode (2, 3 and 4)

Indexs

It has been incorporated the following Remote Sensing indexes in the corresponding MiraMon module: AVI, GEMI, NDWI-1, NDWI-2, EVI, AFRI and PRI. The WIndexs interface also supports select and configure anyone of these new indices.

TST

It allows calculating the surface temperature from a Landsat type image.



TOA

It allows obtaining the apparent temperature/reflectance.

8.26 RAWIMG

It Imports a binary image of any type (also in the Motorola order, as well as in formats not supported by MM such as unsigned short integer) for multiband, BSQ, BIL or BIP to IMG MiraMon format. It allows importing metadata from a HDR file (typically from ENVI) or explicitly defining them.

8.27 RegMult

This module, which combines statistical methods (multiple regression) and spatial analysis (interpolation) for spatial modelling, has been enhanced by adding the option of ***imposing all the independent variables*** (and not selecting the most informatives), as well as ***implementing the cross-validation*** for all the options of regression and interpolation.

8.28 RegLog

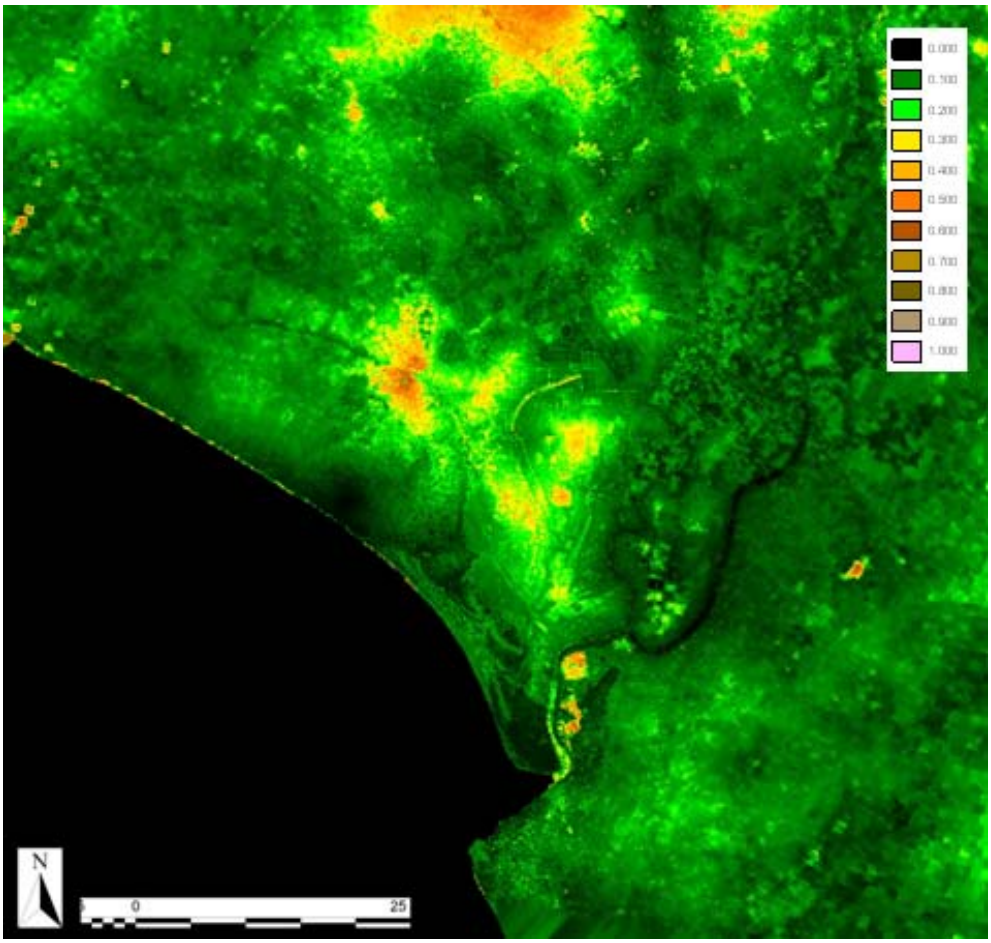
The intention of the RegLog module is to perform ***multivariate logistic regression.*** This statistical tool is intended to predict the occurrence probability of a dependent variable Y, enclosed between 0 and 1 (i.e., presence, success, etc), and typically adjusted to a logistic curve (S-shaped), depending on the observed values of independent variables supposedly explanatory, as well as evaluating the relationship or the effect of these on the dependent variable. Therefore, the RegLog module allows generating a quantitative model, of a range from 0 to 1, of a space variable, typically dichotomous, adjusting the coefficients of the logistic multivariate regression formula using the maximum likelihood method.

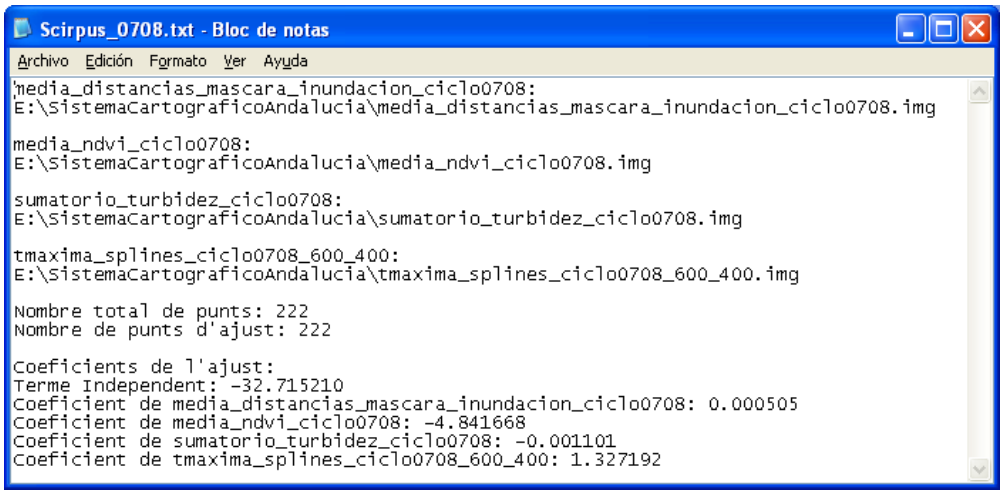
In logistic regressions, the independent variables can be both continuous quantitative and categorical (and, in particular, also dichotomous) and it doesn't assume normal distribution nor constant variance throughout its distribution (Homoscedasticity).

In the RegLog module, the explanatory variables are rasters in IMG format and the samples of the dependent variable are arranged in a structured file of points (PNT).

$$P(Y=1)=\frac{e^{Z}}{1+e^{Z}}=\frac{1}{1+e^{-Z}}$$

$$Z=a_0+\sum_{j=1}^{N}a_j\cdot X_j$$



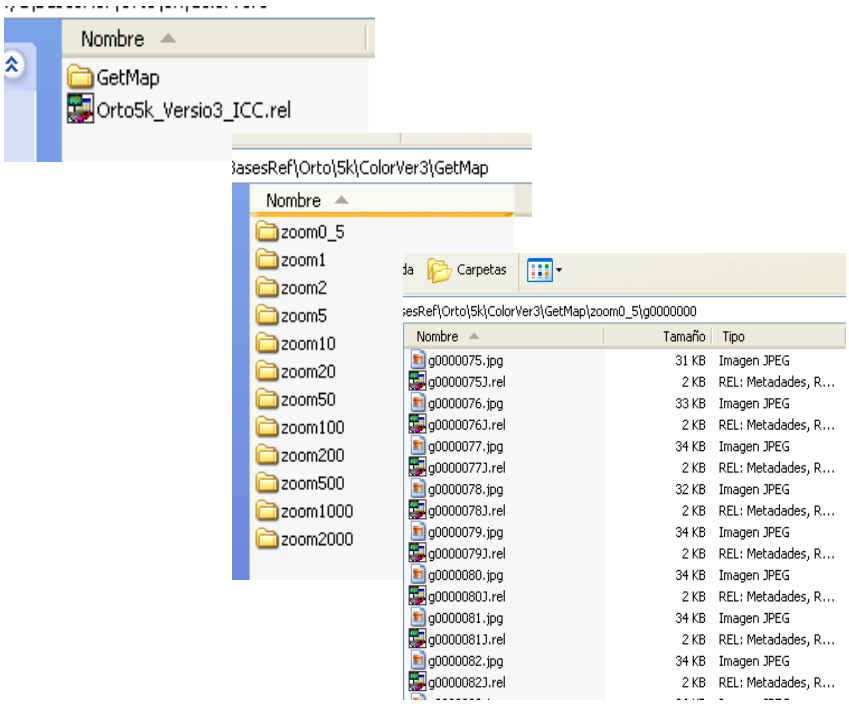


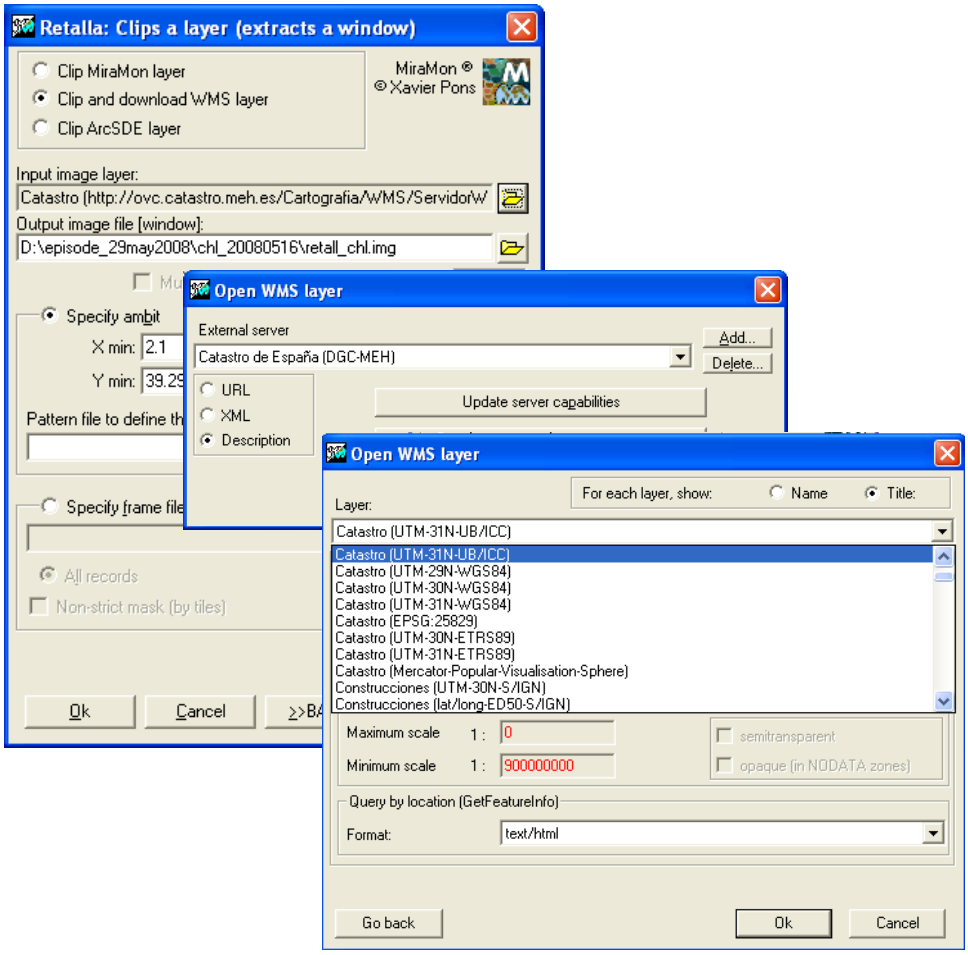
8.29 Layer clipping

It has been incorporated layer clipping from an ArcSDE layer, either on a REL file conveniently generated, or on a SDS file. It can also be chosen the ambit of the output from an ArcSDE layer.

3D layers support is given for cutting and mosaicking vector features.

It has been implemented the ability to cut **WMS layers** of external and local servers, both by area and frame. The result of this cut is a set of small rasters distributed in a pyramidal way (REL5 format of MiraMon).



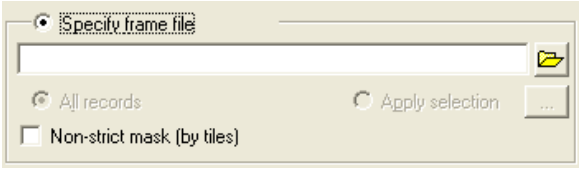


It has been added the ability to cut by a non-strict mask, by using the tiles model of the WMTS *(Web Map Service Tilings Standard)* standard of the OGC developed by MiraMon. For more information:

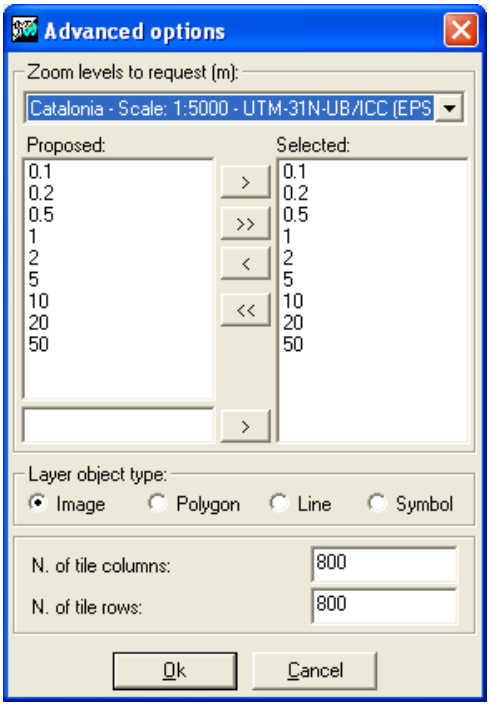
http://www.creaf.uab.es/miramon/publicat/abstract/jidee08/Abstract_Historia_y_estado_actua_del_futuro_WMTS.pd phy

http://www.opengeospatial.org/standards/wmts .

It has been incorporated the possibility of layer clipping WMS servers from a specified ambit or a frame. The layer is requested to the server in the whole set of the indicated zooms and this is then saved in REL5 format. By making successive calls to the clipping module, the various visualization styles of the layer can be added to the REL5 or adding additional zoom levels that were not done when the initial download was made.

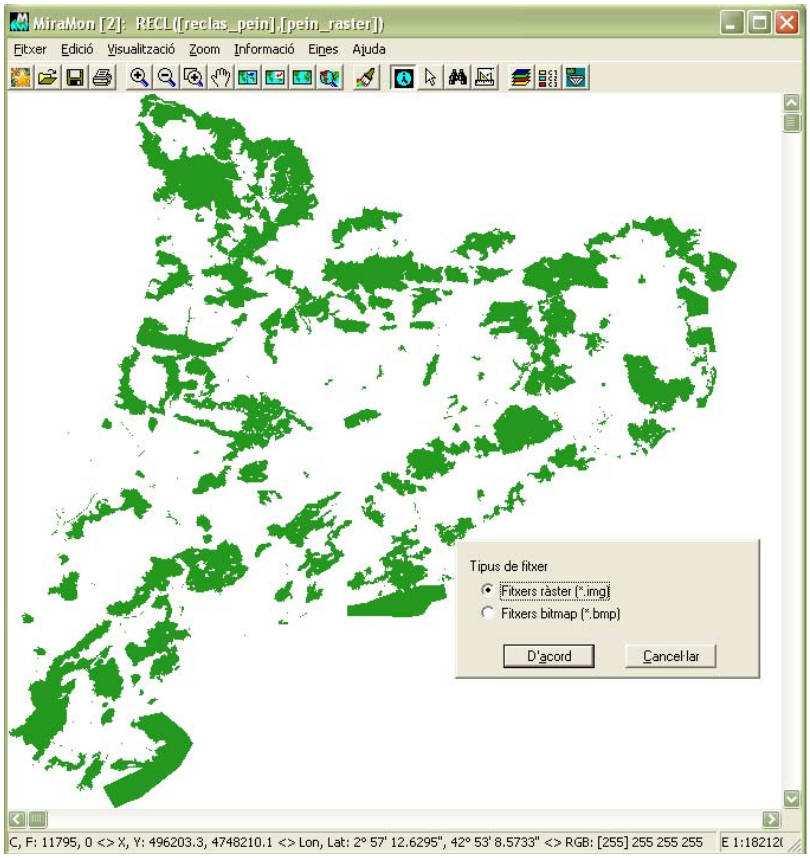


The Advanced options allow you to choose the desired zoom levels of the layer cut. The program offers recommended zoom levels, but it also allows the introduction of other user-defined intermediate levels.

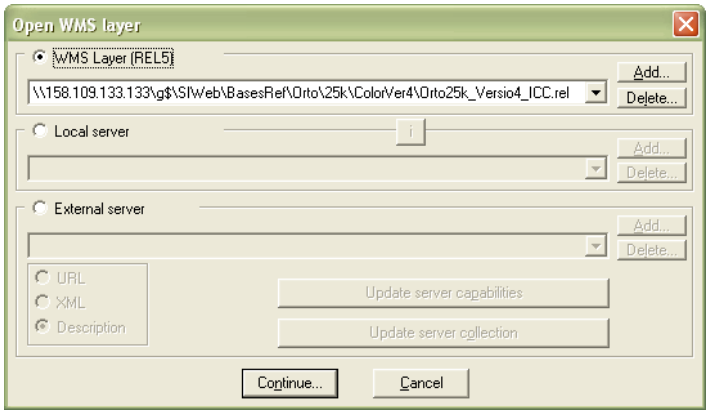


New dictionaries are defined, M_WKSS.ini and U_WKSS.ini, which contain well-defined sets of scales from the OGC *(*Well Known Scale Sets, WKSS) and other of general purpose. The use of these dictionaries can be incorporated by selecting the pyramid zoom for the cut of WMS layers of external servers. These new thesaurus are going to be distributed in this new version.

When viewing a WMS layer from MiraMon it is also possible to save a WMS cut of the current view scope through the menu "File | Save raster/WMS as raster…".



To open a REL5 layer it needs to be done through the "File | Navigate WMS servers" menu and then choose the first option WMS Layer (REL5)



8.30 SDEMM

It allows importing, with or without topological structure, of geographic databases contained in ArcSDE servers from ESRI, discussed at length previously.

8.31 UnirVEC

It has been added the merging, without topological restructuring, of PNT, ARC, NOD and POL files. This new mode also supports file lists for massive mergers. Output structured files are marked as not topological, since no topological consistency of the structured files is tested.

It is now possible to merge polygons as explicit polygons indicating directly a list of polygons instead of a list of arcs and few prefixes and suffixes (the most sophisticated case that was programmed).

8.32 Vargram

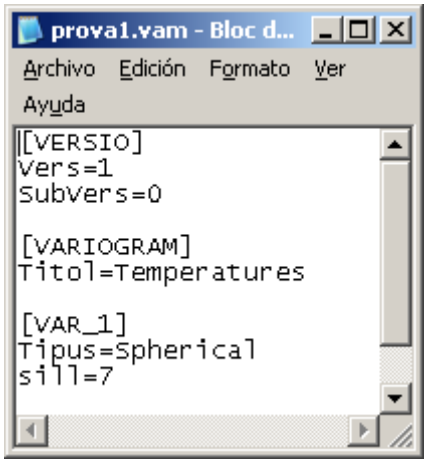
Kriging is a sophisticated interpolation technique of irregularly distributed point data based on spatial statistics. Interpolation using this technique includes two phases:

- The study of the spatial distribution of the variability of the studied variable in order to adjust a feature called semivariogram (or variogram).
- The interpolation itself to generate the raster with the values predicted by the model at each point.

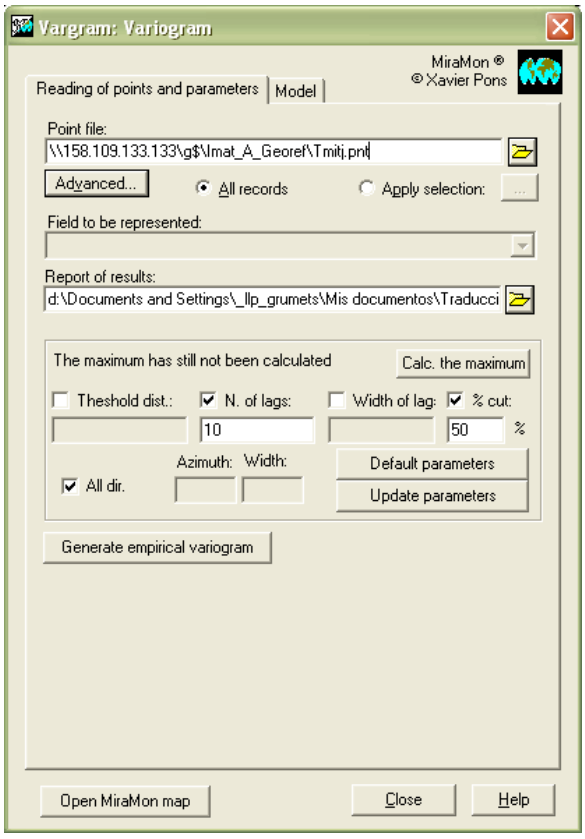
For this reason, the kriging implementation in the MiraMon has been performed in two modules, a new one, **Vargram,** and an existing one, **InterPNT,** which becomes a new option that adds to the already existing ones (inverse of the weighted distance interpolation and spline*).*

Regarding the **Vargram** module, in this case, is in the interface form (**WVargram** dialog box) where the main utilities are, while the module command line (Vargram) has not been developed due to the interactive nature of this process (exploration and graphical display). WVargram is the tool that represents and models the so-called semivariograma, a feature that represents the spatial distribution of the data variability.

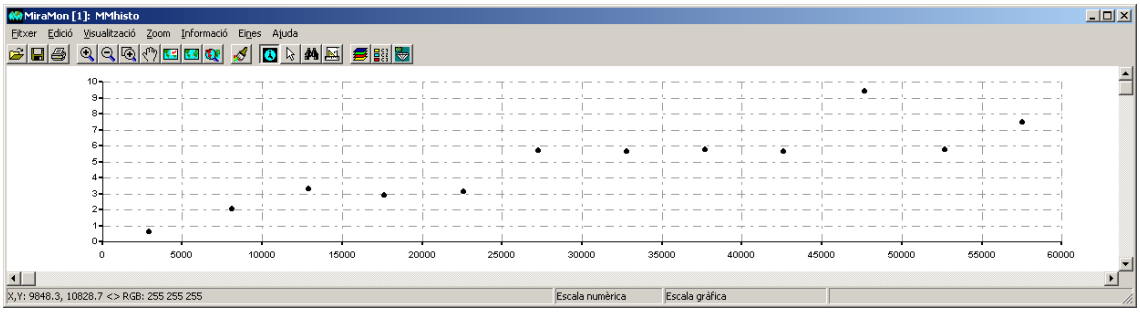
With this module the user constructs the adjusted variogram as a sum of some implemented elementary variograms: nugget, spherical, quadratic, linear, exponential and gaussian, from the empirical variogram constructed with the data itself. This is saved as a **VAM** format file**.**



The construction of the variogram consists of two stages organized as two tabs in the WVargram interface. Firstly, the properties of the sample points should be fixed and the geometric parameters and the empirical Variograma should be defined.

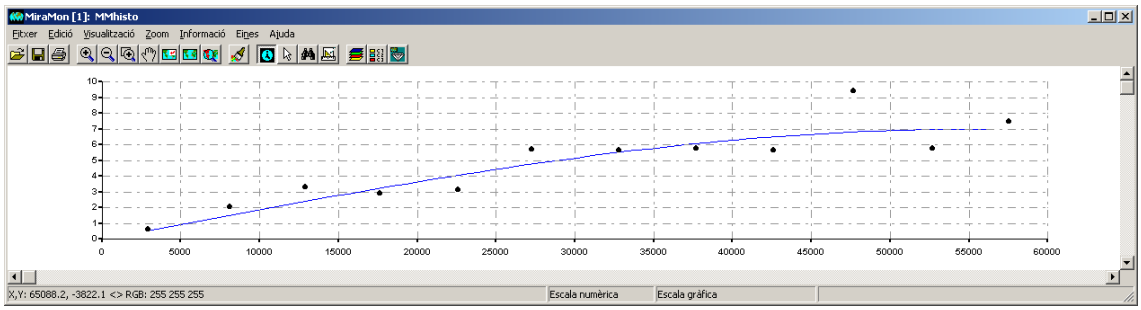


This first parameterization will lead to the first points of the empirical variogram:



Secondly, the items and the parameters for each variogram that will form the composite variogram should be chosen. Note that it requires some prior theoretical and practical knowledge about the structure of the variogram to find in an appropriate way, a variogram useful for interpolation.

This second modelling will lead to the graphical line of the adjusted variogram and, if deemed valid, it will be accepted to be used by the interpolation module.



8.33 Visible

The visibility analysis module allows determining **which areas are visible** from certain viewpoints.

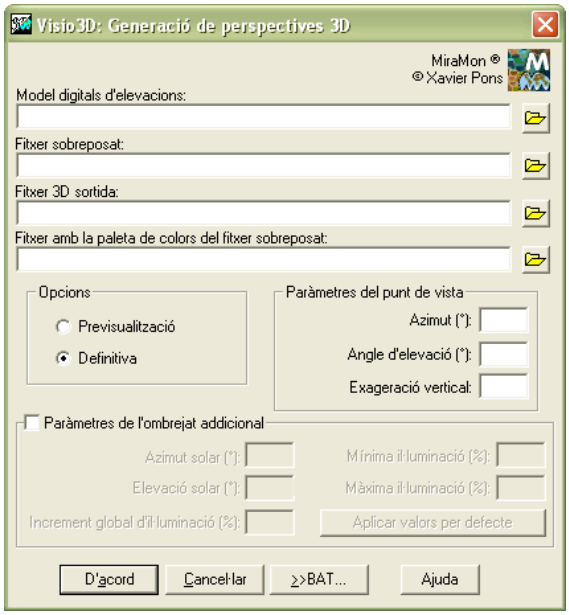
It has been introduced the parameter /RES_PERFIL that allows to modify (increase to improve the resolution) the number of calculations of visibility for pixel side along the topographic profile.

8.34 Visio3D

This module allows generating a ***3D view*** from a digital elevation model combined with any image: thematic, orthophotography or any continuous model such as DEM. ***There is no need that the areas and the resolution of the two images are perfectly matched,*** the resulting model will automatically adjust to the intersected area and to the resolution of higher detail of the two images. There is the possibility of having a **shaded *representation*** modifying the colour intensity from a point of illumination.

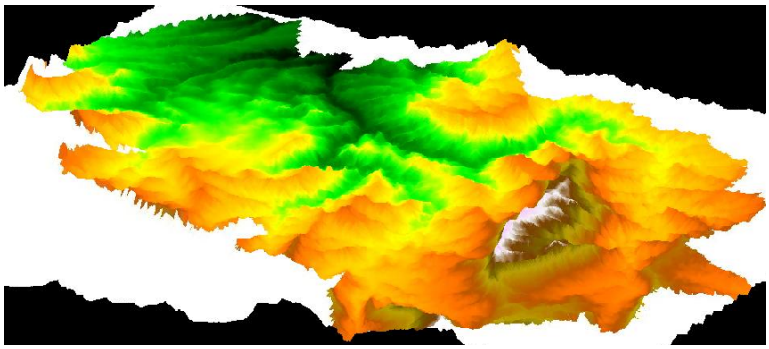
The program has a recommended fast mode ***(preview)*** to select the geometric parameters closest to the representation desired to achieve. The final mode will be slower but will result in a three-dimensional representation of higher quality.

The interface that allows configuring parameters for a particular performance is:

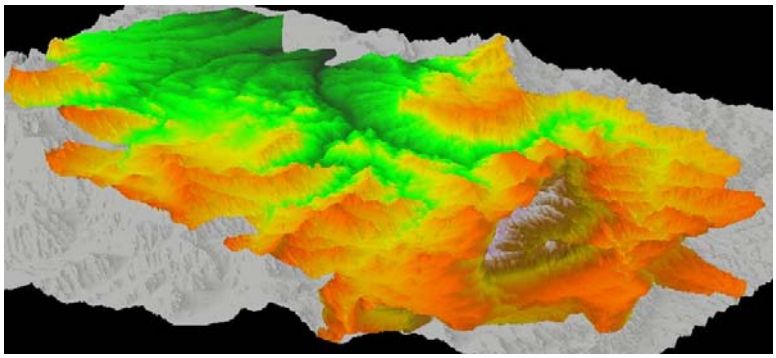


Here are ***some examples:***

3D perspective of a Digital Elevation Model:



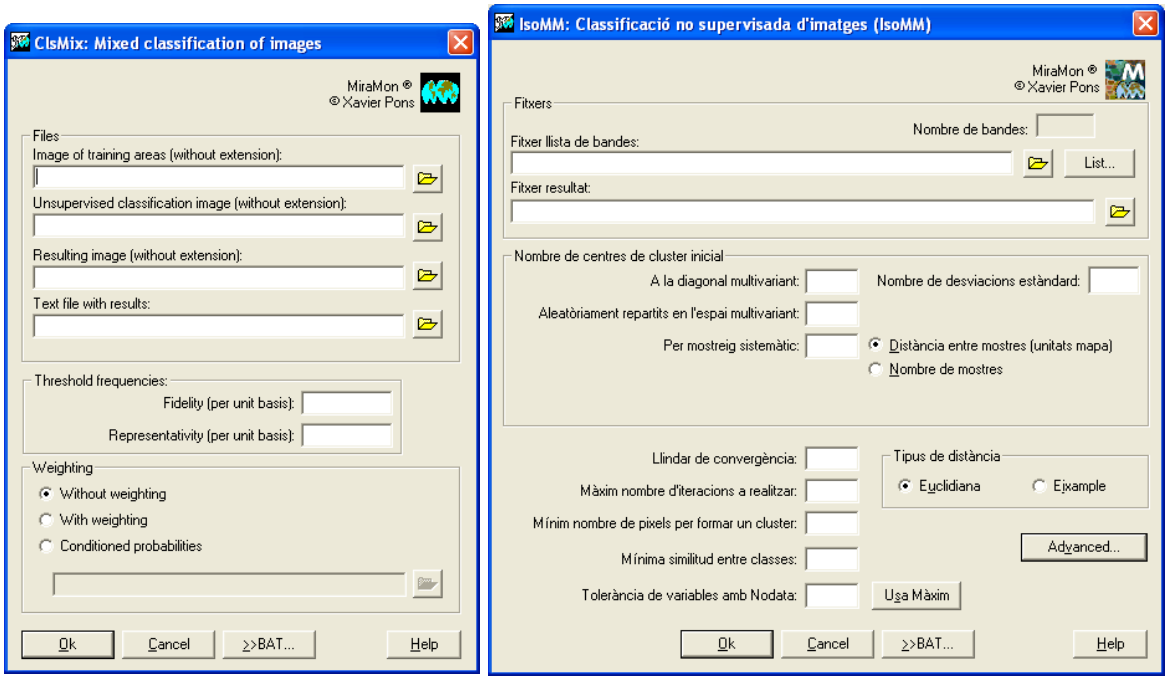
And, with the shadow of the own model and the surrounding area just shaded and with a less intense lighting:



3D perspectives of a 1:25000 8-bit colour Orthophoto, in general scope and in detail:

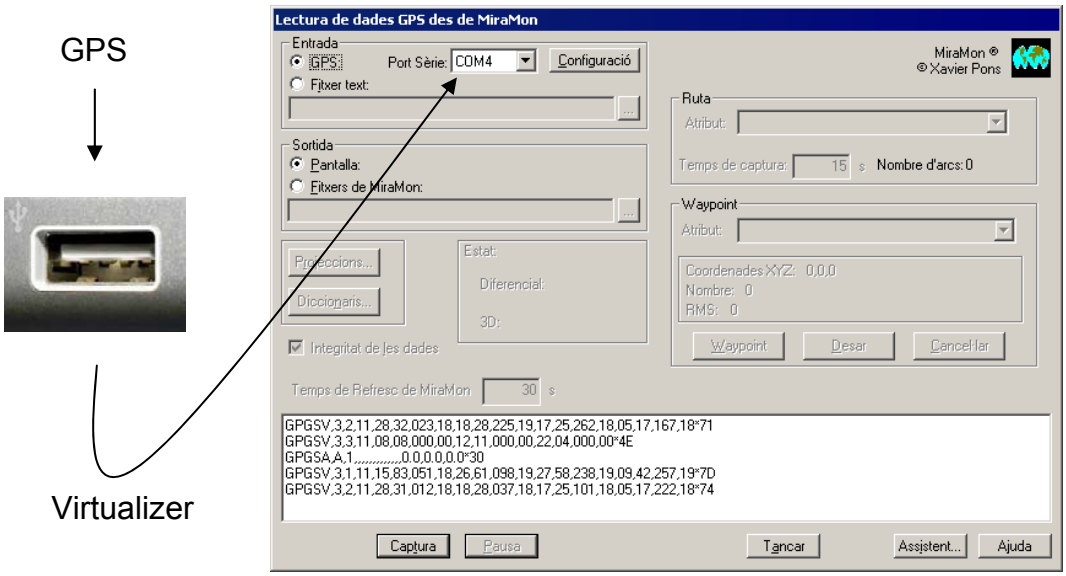
8.35 Other

Several improvements have been made to **CEOSIMG** for the case of Landsat-5 (image indexing, automatic palettes, better treatment of NODATA, etc). **MOSAIC** fully supports 3D points. **CANVIRES** supports JPEG and incorporates the ***median*** as a criterion of contraction, as well as the mode for different types of byte (integer, real, long). **RETALLA** supports WMS layers. **CLSMIX** and **ISOMM** have had several improvements to the classification of Remote Sensing images.



Regarding the **GPSMM** module, it allows the reading of real-time data from a GPS plugged to a serial port (COM), the solution to use this module in current computers that no longer have these communication ports, is to install a virtualizer of serial port. The GPS can be plugged to a USB port of the computer and the virtualizer will transfer the information as it was a real serial port. Some

of the most well known virtualizers are Spanner from Garmin (http://www.garmin.com) and GPSGate (http://gpsgate.com/).



9. MiraMon Mobile

The development of the MiraMon Mobile has been done in 3 axes that are described in: http://www.miramon.uab.cat/mm_mobil.

9.1 MiraMon Alfa

It is an experimental demonstrative application of the capabilities of the Windows Mobile operating system. It is a simple and light weight application that provides the following capabilities:

- GPS of the device*:* The application works with the GPS of the device, centring the mapping in the latest GPS position point. The position appears on the screen as a square or as an arrow, depending on the speed of movement. The GPS coordinate controls the area of the map displayed on the screen. However, the user can choose to manually move the area shown with the stick or with the keys of the PDA.
- While showing the coordinate, the following information is visible on the screen:

  X: the longitude of the position

  Y: the latitude of the position

  The **speed** in kilometres per hour

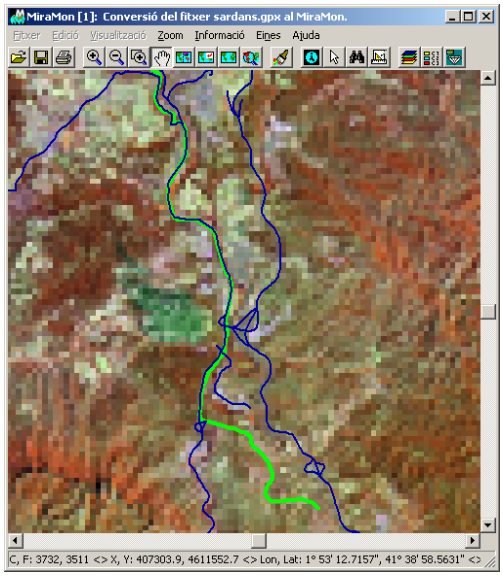
  The **direction** in degrees

Z(H): an approximation to the altitude indicated in a topographic map (orthometric altitude)

Z(h): the altitude over the terrestrial ellipsoid which is used as a geodesic reference

Sat: it gives information on the number of satellites that have been used to calculate the position, as well as the number of available satellites over the horizon at that particular time.

- Saving the track*:* GPS route can be save as a GPX file which can then be viewed in the professional MiraMon for PDA or PC.



- Zoom levels: The zoom level can be controlled through the menus (zoom in/zoom out) or by double-clicking on the screen to get closer. Displacement over the map can be done by dragging the stick on the screen or by using the side sliders.

- Mapping WMS: If there is Internet connection, the application is able to connect to a predefined set of WMS servers.
- Reading local files: it can open raster files saved in local in JPG, GIF, PNG, BMP, and JP2 formats. The accepted georeference is in world format and in WGS84 long/lat. The world format is a simple text file that indicates the coordinate of the image first cell and cell size (extension JGW, GFW, PGW or BPW for JPG, GIF, PNG or BMP respectively).
- Target position and direction tools: it can be specified a coordinate as a destination position. Then, a tool is displayed which indicates the real direction to follow from the GPS position to reach the target position. If the GPS position is off the screen, it is indicated by a puppet and a direction arrow on the map indicating where the user is. If the position of the target position is also off the screen, it is indicated with a flag and an arrow indicating the direction of its position.

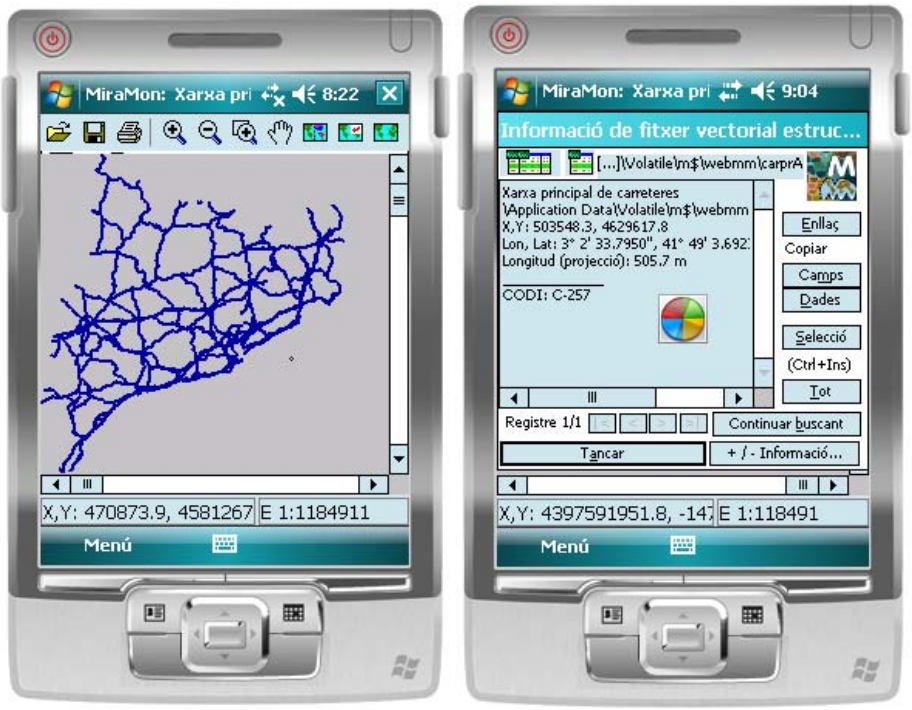
9.2 MiraMon for PDA

The Professional MiraMon has been adapted to operate in PDA and smartphones. It incorporates most features of the Professional MiraMon for a desktop PC, but:

- It is not included the support to MrSID format or access to tables via ODBC, which limits the table formats to DBF (although related to any nesting level, number of links per field, etc).
- It is not incorporated most MiraMon support modules (MSA). These more advanced analytical capabilities have not been migrated to the PDA, since it is believed that are poorly suited to this environment, at least for now).

The dialogue with the user has also been well adapted to the physical dimensions of these devices.

It is important to note that it directly supports MMZ format distributed by a large number of official institutions of Catalonia and other entities.



9.3 MiraDades per a PDA

As outlined in section 8.2, the MiraDades application has been adapted to work within mobile devices such as PDA or smartphones, as a visual display unit and as an editor for DBF tables (in this case, support to ODBC is excluded). It incorporates all the management table tools such as join between tables or fusion of these.

10. MiraMon Map Server: Improvements and new features

- Full support has given to the current version of the recent WMTS OGC 07-057r6, similar to the WMS standard but based on space tiling. More information at:

  http://www.creaf.uab.es/miramon/publicat/abstract/jidee08/Abstract_Historia_y_estado_actua_del_futuro_WMTS.pdf

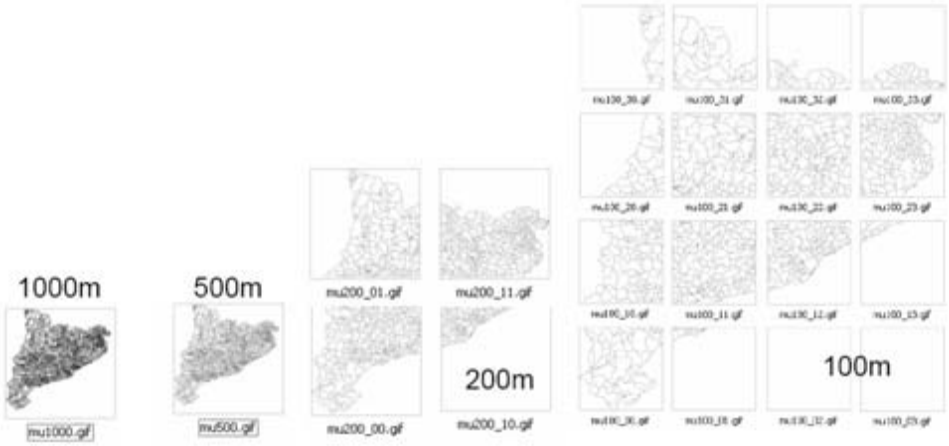
  A Navigator example of this new standard has been created in: **www.opengis.uab.es / wmts / tiledWorld** .

  Some characteristics of tiles servers of MiraMon are:

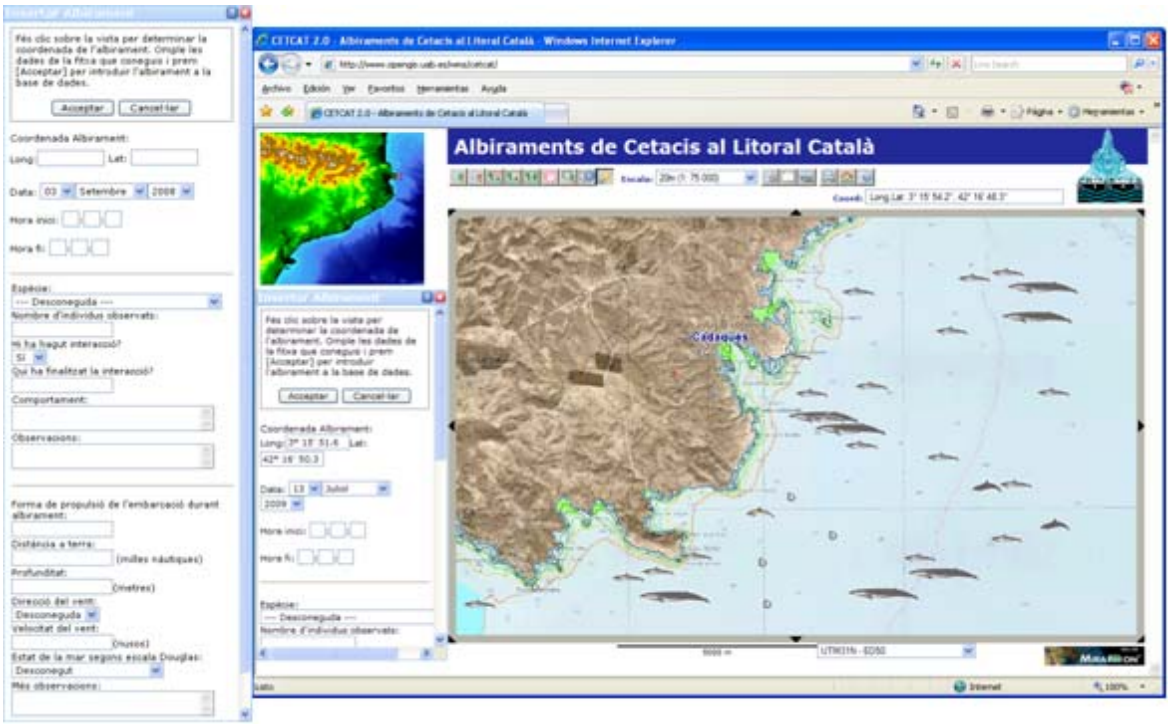
  - Each layer (raster or vector) that is incorporated to the server must be pre-rasteritzed.
  - This pre-rasteritzation is done for a set of pixels. Usually this set is adjusted to the resolution of the data, and usually the most typical sizes are: 1000, 500, 200, 100, 50, 20, 10, 5, 2, 1m.
  - Rasteritzations are based on a tiles system, a pyramidal scheme where each layer is rasterized and segmented into fragments of

constant size for each pixel side. Each of these fragments is a georeferenced GIF, JPEG,...

- This pyramidal structure of fragments allows the server to respond to customers' requests quickly and with the utmost quality, even when the layers are very large or very complex, and it also allows intermediate servers of the Internet network to respond to requests of different users with the same map, preventing the original server to address many of the requests and also avoiding too much traffic on the network.



- We have conducted first tests of creating collaborative web environments 2.0 following the ***Web Map Service (WMS), Web Feature Service (WFS) and WFS-Transactional*** standards***.*** The server is an application of CGI type that processes transactions by using XML DOM structures, transforming the data to the required format and inserting them into a common database. Data is sent to the server asynchronously using AJAX technology and using the HTTP-POST method and the WFS-GML format.




```
<?xml version="1.0" ?>
- <wfs:Transaction version="1.1.0" service="WFS" xmlns="http://www.opengis.uab.cat/cgi-bin/CETCAT/fc/Albiraments" xmlns:gml="http://www.opengis.net/gml"
  xmlns:ogc="http://www.opengis.net/ogc" xmlns:wfs="http://www.opengis.net/wfs"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/wfs
  http://miramon.uab.es/ogc/schemas/wfs/1.1.0/wfs.xsd
  http://www.opengis.uab.cat/cgi-bin/CETCAT/fc/Albiraments
  http://www.opengis.uab.cat/cgi-bin/cetcat/MiraMon5_0.cgi?
  VERSION=1.1.0&SERVICE=WFS&REQUEST=DescribeFeatureType&
  OUTPUTFORMAT=text/xml;subtype=gml/3.1.1/profiles/gmlsf/1.0.0/0
  &SRSNAME=EPSG:23031&TYPENAME=Albiraments">
- <wfs:Insert idgen="ReplaceDuplicate" srsName="EPSG:23031" handle="0">
  - <Albiraments gml:id="080903Sc1205">
    - <gml:position>
      - <gml:Point>
          <gml:pos>522406.6 4674301.8</gml:pos>
        </gml:Point>
      </gml:position>
      <data>03-09-2008</data>
      <h_inici>03-09-2008</h_inici>
      <id_especie>Sc</id_especie>
      <num_indiv>20</num_indiv>
      <interaccio>T</interaccio>
      <fi_interac>ells</fi_interac>
      <comportamt>anaven nedant al costat del vaixell, jugant i
        menjant</comportamt>
      <observacio>eren dofins de color gris amb una franja més clara als
        costats</observacio>
      <propulsio>motor</propulsio>
      <dist_terra>7</dist_terra>
      <prof>100</prof>
      <veloc_vent>10</veloc_vent>
      <dir_vent>N</dir_vent>
      <douglas>2</douglas>
      <foto>F</foto>
      <foto_id>F</foto_id>
      <video>F</video>
    </Albiraments>
  </wfs:Insert>
</wfs:Transaction>
```

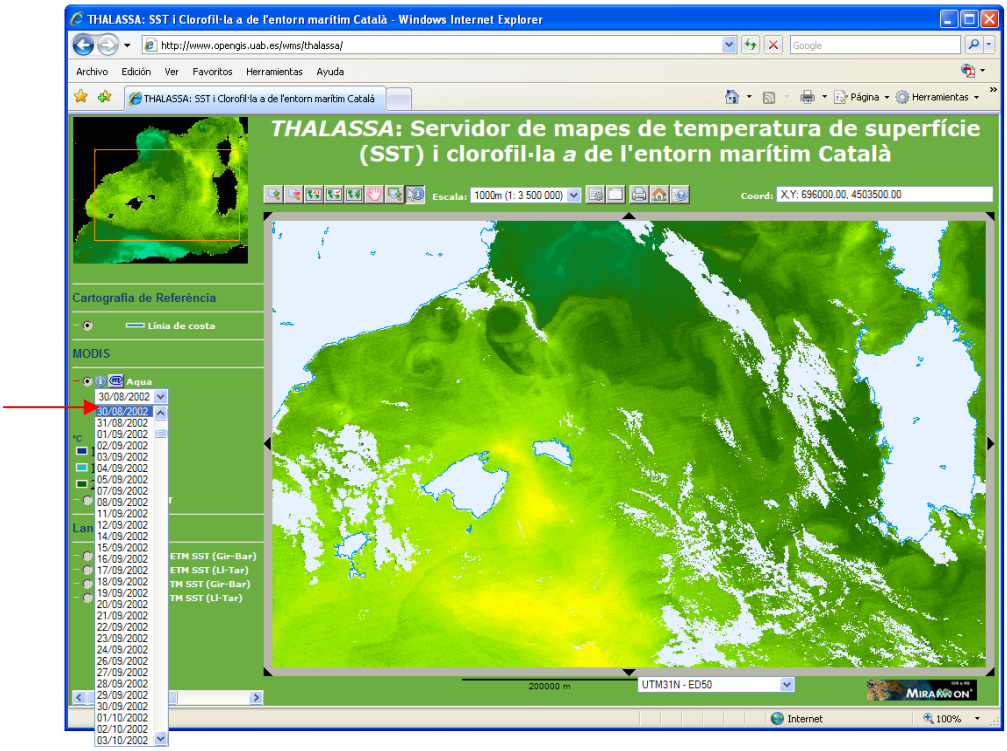
- It has been conducted a strict review of the different versions of the WMS standard of the OGC, according to this review several improvements and corrections on the server have been made in order to be more strict in monitoring the OGC standards, for example, negotiating the version of the requests.

- It has been implemented a new OGC WFS service (Web Feature Service) based on the GML language *(*Geographic Markup Language*)* for point layers of any database (DBF, Oracle, SQL Server, MS Access, ...).

- It has been extended the WMS requests own syntax so that cascade requests can be made to other external servers. This is very useful to

avoid the security restrictions that block the performance of requests to other servers.

- It has been implemented the WMS parameter that supports the ***TIME*** dimension and allows asking for layers according to a date-time, and therefore allows defining layers made out of time series.



- It has been expanded the options of the preparation of layers in the WMS server, introducing the preparation of point layers with symbols from a field and from a symbolization table.

- It has been developed a feature to smartly ***place names and symbols*** (small icons) in the sense that when they are "cut" right in the edge of the area, they are moved inwards or completely out of view depending on how much text/picture is beyond the requested scope. You can see the effect at http://www.opengis.uab.es/wms/bau where both the text layers as well as the layers of symbols are smart.

- It has been designed a new format of query by location based on "GML simple profile level 1". The new request DescribeFeatureInfoType(), added to the WMS service, of our own definition, allows knowing the validation schema of a query by location in GML format.

- The server now supports GetCapabilities, GetTile and GetFeatureInfo in KVP and in SOAP.

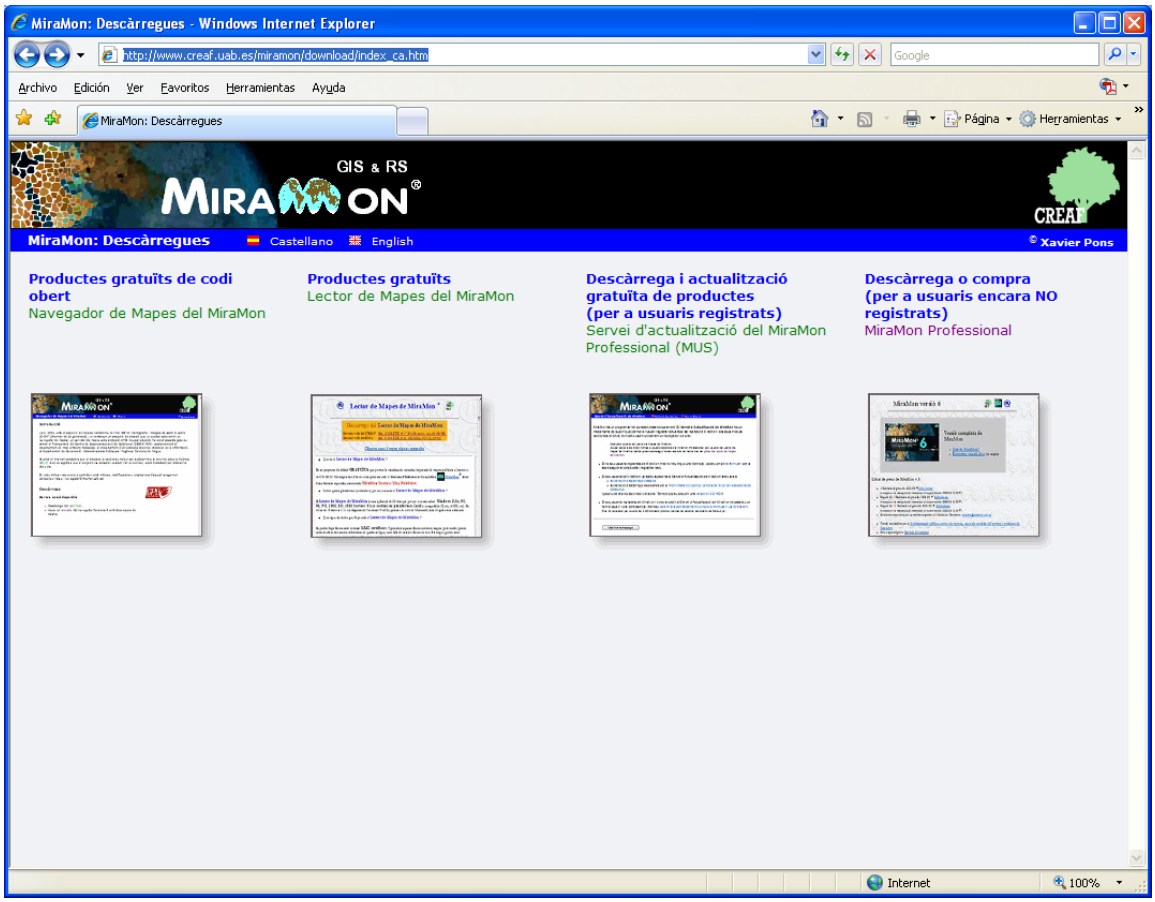
- The Navigator now supports GetTile and GetFeatureInfo in KVP, SOAP and in RESTful.

- It has been added new optional parameters to the implementation of preparation of the layers for the MiraMon Map Server (CreaMMS) that make the tile model of MiraMon to converge to the WMTS of OGC suggestion. The origin of the fragmentation has been changed: now it is on the high left corner of the image (before it was on the below left corner of the image) and it has been added an optional parameter that allows choosing full-size and constant tiles, or adjusting them to the pattern extent of the layer. This last option means that not all tiles are of the same size.

11. Telematic installing and uninstalling

The traditional installation of a license based on a floppy disk key has been replaced by a telematic installation with or without direct connection to the Internet, which has been fully implemented to the extent that non old licensing system distribution has been done during the last year. The new system allows installing and uninstalling, so that upgrades and new licenses are carried out this way, unless the user still prefers the previous system of the disk, which will be available for a while.

It has been improved the access to each of the different possibilities of acquiring MiraMon through integrative interface: http://www.creaf.uab.es/miramon/download/index_ca.htm



12. Some features planned for V.7

As stated in paragraph 2.1, the v.7 of MiraMon wants to cover, among other improvements, ***easily opening of most commonly used maps*** in a ***collection of favourite maps,*** as well as to ***facilitate the user's location on the map from the first moment,*** through the ***query by toponyms or query by coordinates*** obtained from GPS, etc. However, there is a second search level, more advanced, which will allow finding the needed information and which is in the local network or in Internet. To this end, we are working on the design and implementation of an ***advanced searching tool,*** through a ***line catalogue integrated to the own MiraMon system,*** allowing ***searching by geographic area*** (in any coordinate reference system, street names maps, etc), **by *thematic, by date,*** etc, ***regardless of*** the ***format and the location information*** (provided it has been published, of course), ***find it*** and ***take it to the heart of the MiraMon***, for consultation, to work with it, etc. Naturally, for this to be possible the MiraMon will work with the existing metadata catalogues, conveniently filtered and with data availability through a real mechanism of access (from simple WMS display to downloads of *de facto* standard formats or via *de iure* standard protocols*).*

Some additional specific intentions are:

Professional MiraMon:

- To recognize that a dbf field linked to a raster is a hyperlink.
- To import z coordinates.
- To directly digitize structured polygons.
- Multiplefield texts, especially useful when we want to visualize the contents of multiple fields or multiple records at once (maximum 6). In the tooltips, the same strategy would be used.
- To use the objects selection to perform some operation on the subset, such as changing their attributes (assigning, for example, one particular owner to all selected plots), delete them, etc.

MiraMon Supporting Modules:

- Mosaicking maps tool: To allow creating a single map that could open others, obtaining:
    - An MMM (or MMZ) that contains all the original layers of mmm. In this case the layers remain unchanged.
    - An MMM (or MMZ) that contains a layer mosaic assuming that the first layer has to combine with the first, the second with the second, etc.

- Cartographic generalization: To allow parameterization in decimal percentages of coverage for areas and perimeters (absolute and percentage).

- Regions from isolated occurrences tool: To allow elaborating in-field maps of contour lines with the Kernel method from specific locations given by a GPS built into an animal.
- In GeMM: To be able to import 'thematic' sections of a XML. To import a ISO19139 document with all its metadata (currently only exported).
- To develop a REL from a layer (raster or vector) that can be anywhere.
- To write GPX files from PNT and ARC files of MiraMon. Already partially done in 2D.

13. Final Note

As always, all your suggestions, bug reports, etc, are welcomed at suport@miramon.uab.cat . Thank you very much.