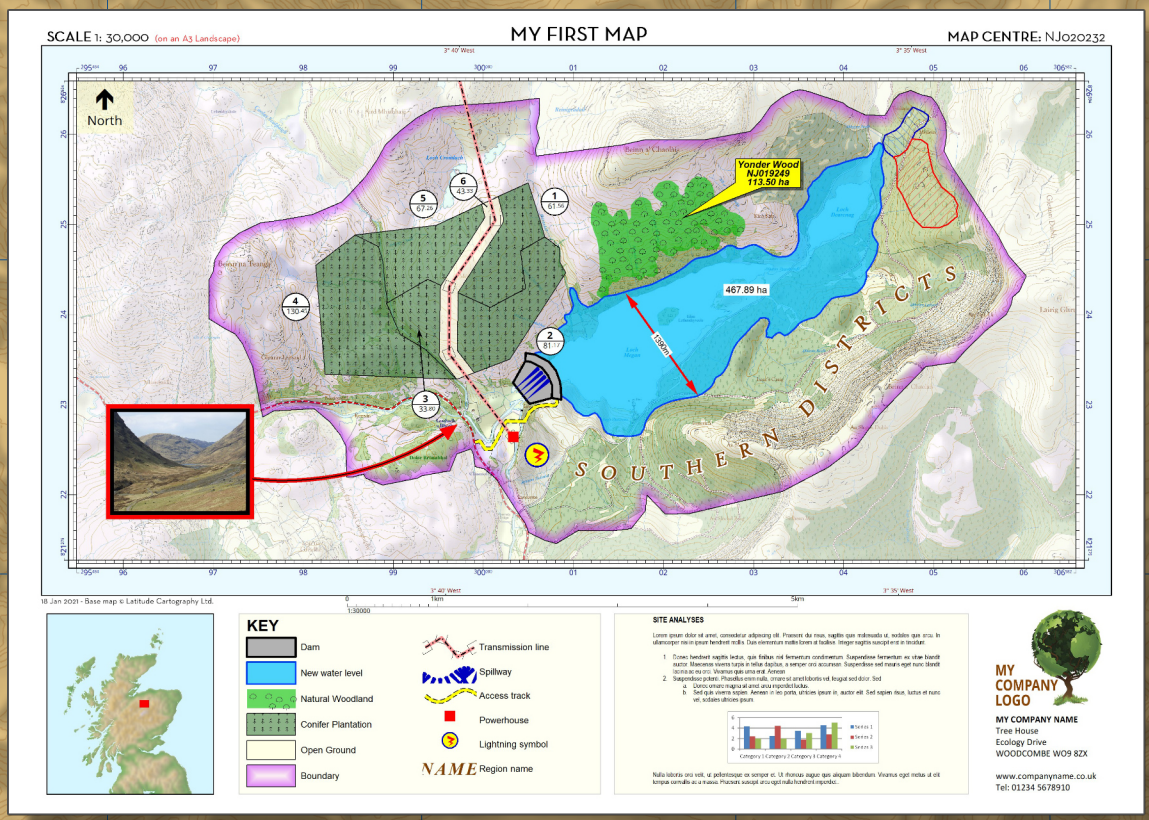
MAP MAKING

for professionals and absolute beginners

a STEP by STEP guide using Map Maker 5

- Hanno Koch -



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Her Majesty the Queen
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Latitude Cartography Ltd.
Manston

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Hanno Koch

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About the author:
Hanno Koch founded 'Latitude Cartography' in 1999 and produces topographic Base-maps, management plans, GIS set ups and offers training for e.g. Ecologists, Farmers, Foresters, Hobbyists, Land Agents, Land Owners, Marine Biologists, NGO workers and organisations.

Before moving to the United Kingdom, Hanno worked in the Dutch Armed Forces as a qualified land surveyor. Early in his career he found his way into cartography using traditional reprographic techniques. He worked for 11 years for the former mapping division of the Royal Dutch Airlines (KLM) and started the first digital cartography department and was eventually made responsible for all of the division's international mapping projects.

In January 2008, Latitude Cartography was granted the Royal Warrant of Appointment to Her Majesty The Queen in recognition of services and products rendered to the Sandringham Estate.

Preface

Maps are often used as a management tool. Regularly they are the outcome of an expensive and time consuming project,
... or ...
they may lead up to valuable new projects.

If we fail to present our maps well the project may lose a costly punch. It is therefore wise to have, or be able to make, good quality maps.

This book is the product of many years of training. Ecologists, Farmers, Foresters, Hobbyists, Land Agents, Land Owners, Marine Biologists, NGO workers, teams in large organisations, and many more have followed this course with great success. They were all happy to use these skills at a basic functional level; some pressed on to do more complex GIS work.
This course has proven to be a game changer and a great asset for those who want to improve and bring wider scope to their businesses.

Photocopied paper maps drawn with fuzzy felt-tip-pen lines are a near thing of the past. Map making software has been the main tool for professionals for more than 40 years. This software has evolved from the first simple packages to the use of efficient, but complex, Geographic Information Systems (GIS). This course will establish a solid foundation for basic map making which can also lead to this more complex GIS work.

This course will take you through the steps to make the map as shown on the front cover: step-by-step, click here, click there. This course usually takes about 7 hours to establish a basic understanding what is involved and it will suggest a sensible workflow which can be applied in any map production, whatever map you would like to make.

Needless to say we need good software to do this. A brief software guide is given in Appendix 6 and explains why we use the software Map Maker 5.

Appreciating that not everyone may be using the software every day, the lay-out, index and annexes are such that this book can also be used as a quick reference guide once specifics are forgotten.

Enjoy the ride!

Hanno Koch
Latitude Cartography Ltd

INDEX

COURSE STRUCTURE AND INTENT

The Map Maker manual is like the manual of a car: it will show you where the spare wheel is, how to activate the AC and adjust the mirror: *it will not teach you how to drive the car.*
This course will do just that: it will teach you how to make maps.

The layout of this book
Different fonts are used. This font is used in introductions and for the 'narrative':

> *Every map tells a story, and so there is a narrative involved in making this map. In this course we want to build a dam and implement a hydroelectricity scheme. This has an impact on the landscape and requires careful planning. That's the story which we will make up as we progress in making this map.*

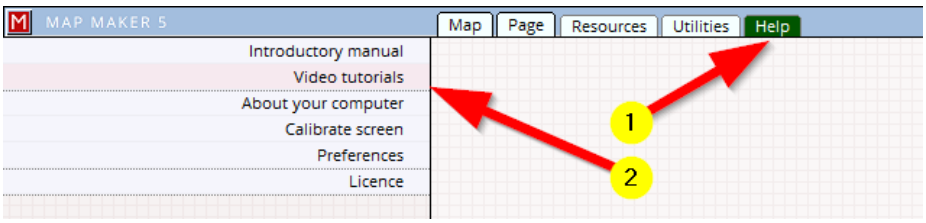
The aspects of this story might or might not apply in your day to day work, but the tools we will learn and procedures advised are the same in *any* map production. In fact the (fictitious) Base-map which we will use has been made with the same software applying the very same elements we will learn in this course.

When we refer to a particular menu, a tab, or specific setting in that menu we use a different blue font.

Images of the interface are annotated with arrows and numbers. Usually the image follows *after* the explanation.

For example:

(1) Click on the Help ***tab***
(2) Click on the Video tutorials ***header***



The chapters are grouped in 'SESSIONS' which might come in useful if you want to go through the book in stages.

This has turned out to be quite a thick volume: fret not, it is because of the excessive use of images which take up a lot of space. I reckon if you were to put your skates on, this book can be dealt with in about 7 hours, and under 2 hours if you are in a hurry... (see next page...).

Key sections for when you are in hurry

If you are in a hurry:

- read through **chapters 1 to 3** – which cover the very basics in double speed.
- Then jump to **chapter 11** to learn how a page layout is made and then
- learn in **Chapter 15** how to save your map as a PDF or print it.

Although we follow a narrative and so it may seem we are jumping to and fro a bit and do things perhaps in odd ways, bear with it because hidden in all this are a lot of good, practical tips and valuable clues as to why some things are done in a particular way and at a particular moment. As mentioned, this sequence of events is typical in most map productions.

Some aspects are explained and repeated several times over, so you do not have to flip back too often trying to find where previous explanations were made.

Use this book as reference book

The content is such that this book can also be used as a reference book. It could well be that only after many months you need to make another map and some basics are forgotten.

In such scenarios:

- read **Appendix 1 and 2** first, then
- use the **Contents index** to find and read up on specifics.

> ***Note:*** *The map which we will make is using a Base-map which is situated in the UK. Map Maker 5 is developed in Scotland and thus the default map projection is that of the UK. For international users please refer to Appendix A5 'Setting up a map projection'* .
>
> ***Note:*** *The Map Maker 5 software is constantly being updated and expanded. Although every effort is being made to keep the images in this book up-to-date, don't be alarmed when some images show tiny variations to the latest version of the software.*

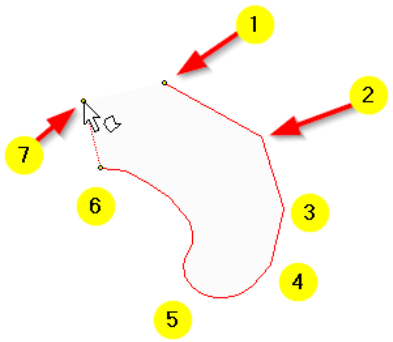
The polygon tool (areas)

Before we start drawing serious map objects let's first dip our toe in the water:

Activate the POLYGON tool and move the cursor anywhere into the map view.

After having activated the tool, we can see that the cursor has changed: it shows a pointer with a little icon representing a polygon (7).

(1) Is the first left mouse click we make on the map, the start of drawing the shape.



Move the mouse to new locations (2, 3 & 4) and click the left mouse button. A straight line is drawn between each click. The computer registers the exact location where you gave a click. Such a location record is called a 'vertex'. A straight line is drawn between two vertices

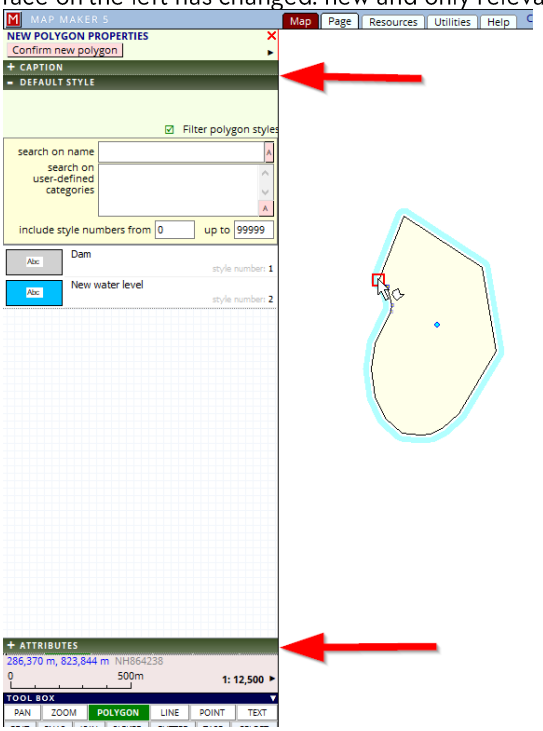
(5) If we want to make a smooth curve we need to reduce the distance of mouse movements and give more clicks.

(6) We may have recorded a wrong location. This can be deleted using the '**Backspace**' key on your keyboard. Whilst you are drawing we can Pan the screen by *pressing the arrow keys* on your key board.

(7) Since we are drawing an area, a polygon, we need to close the loop. This can either be done by clicking again on the starting vertex. Alternatively click the *right mouse key* to inform MM5 that you are done drawing this shape. MM5 will close off the area.

After the right mouse click please note the following:

- we can see that the interface on the left has changed: new and only relevant headers are shown.



- the object we have just drawn has changed its appearance. The red line is now black, it has a yellow fill and it is highlighted with a blue glow.

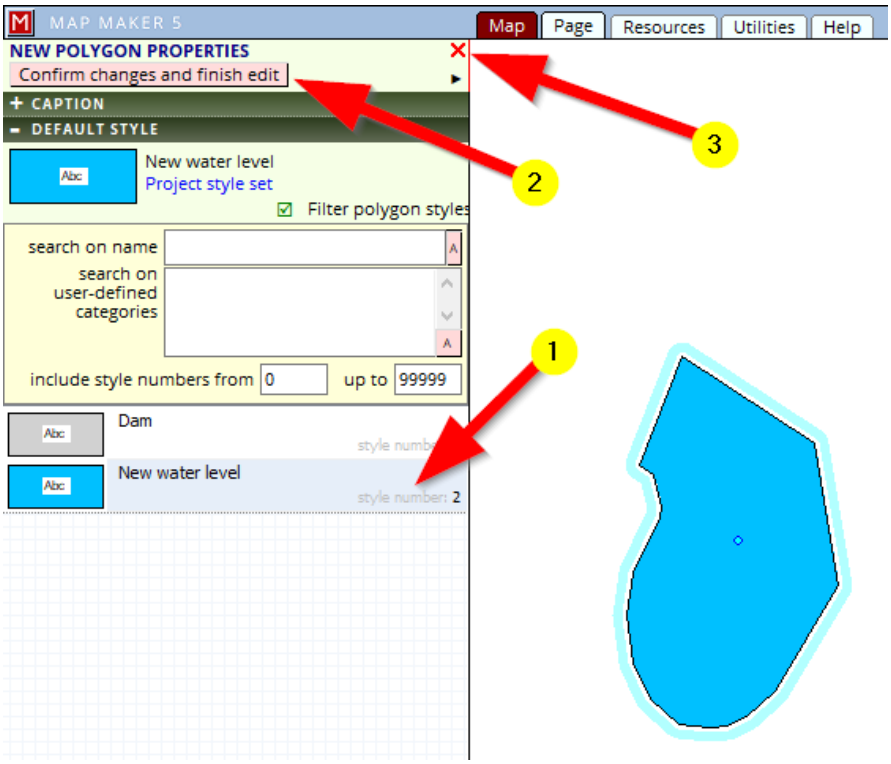
All these changes are to focus our attention, and we now need to make a few choices and add some relevant information (if we want).

These option menus will be explained later, for now click on the header DEFAULT STYLE (if not already open).

With the right mouse click (or by a finishing click *on* the starting vertex), we have informed MM5 we have completed the object we wanted to draw. And now through these menus MM5 is asking us *what* it is we have drawn. In effect, MM5 draws with a *generic pen*.

(1) Select style number 2: 'New water level'
(2) Confirm changes and finish edit
...or ...
(3) when not pleased what has been drawn, click on the red cross which will cancel the new object.

It will now look like this:



The all-important principal to remember is this:

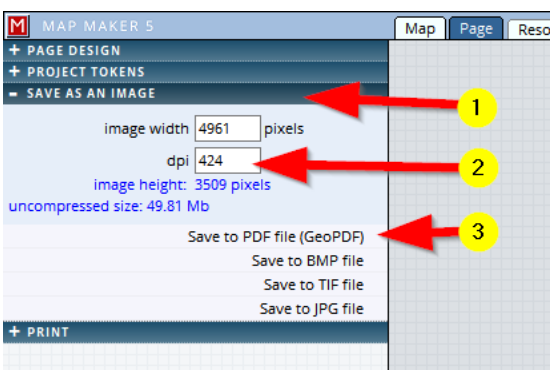
As you can see, it does not yet have the complexity and intricacies of the map as shown on the front page! We will endeavour to do that in the next session.

Save as PDF

We live in a digital age and often we need to email a digital copy.
We can do that too:

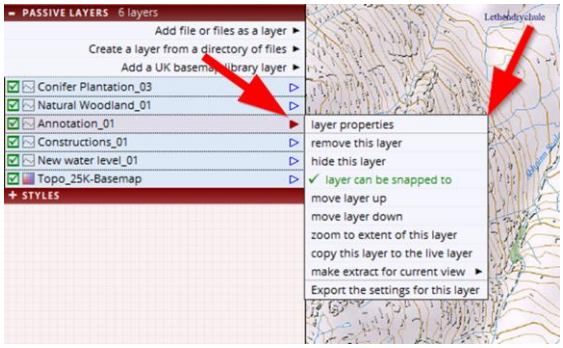
(1) Click on the SAVE AS AN IMAGE header
(2) the map will be changed to a 'raster' file. This means it will consist of 'pixels'. The more pixels there are in an image the higher quality it will have. In the printer world this 'resolution' is defined by the number of '**dots per inch**' - 'dpi' for short.
The more dots per inch, the sharper the image, but the larger the file size becomes.
This is your call, you need to decide what to put in here.
MM5 makes a suggestion, but you may decide to put in another value.

> For a standard high quality print, 300 dpi is a good resolution. If you want to save space in your (or your client's!) email folder then 150dpi might still be perfectly acceptable.
> Just try it and see the relation between file size and quality.



6. Working with LAYERS

When we draw or edit an object, we are doing that in a 'live layer'. Saved layers become
When we select a layer and click on the little blue arrow (which then turns red) we open a new menu dealing with the most immediate actions possible. The actions speak for themselves: e.g. remove this layer, move layer up or down
And we have seen that more specific options can be accessed in the layer properties menu. This layer properties menu can also be found in the LIVE LAYER header.



But why working with layers in the first place? After all, we *can* draw all and everything into one layer and be done with it.

There are 4 main reasons why we would want to split our work up into different layers. These are important reasons, so please take note.

1 Cartographic Effects
It gives us more flexibility in creating specific cartographic effects
course
2 Ease of editing/working with map objects
It is easier to edit map objects. For example, we could dr
when it comes to editing, it then becomes a bit of a
3 Management purposes
It is very likely that some of the map objects
for example a layer with all 'Public Rig
map as well. If however all sorts of
another map then we

object type.
in a polygon exclusive layer, *lines* live in a lines layer, *point* a
and
gement) '**theme'.**
buildings live in one layer, all overhead cables in *another*. All burns, streams and drains
and ditches could live in one layer, standing water (lochs, lakes and ponds) live in another etc.

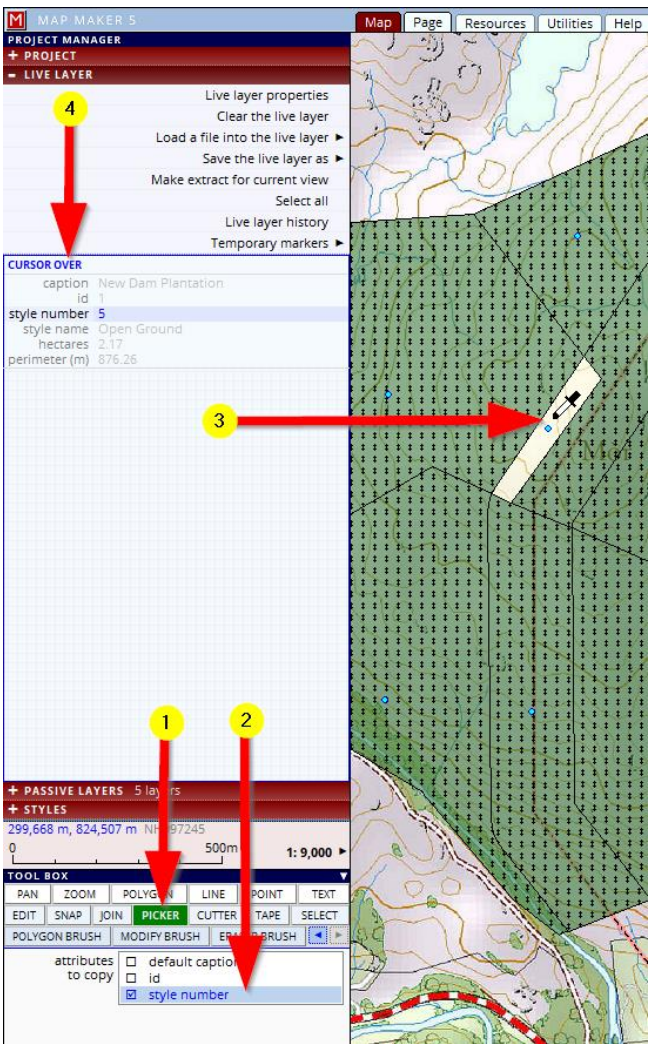
7.3 The PICKER tool

In this simple example we only need to change a few polygons from one style to another, but imagine a big woodland where many compartments might have the same attribute data like Species, Plant year, Yield class, Spacing, Height etc. and of course the same colour on the map - the style. That is a lot of data to type up/change in each polygon.

> The picker tool allows us to *absorb* attribute data from one object *and carry it over* onto the next. It is an immense timesaver to 'populate' your database and to change similar objects in no time.

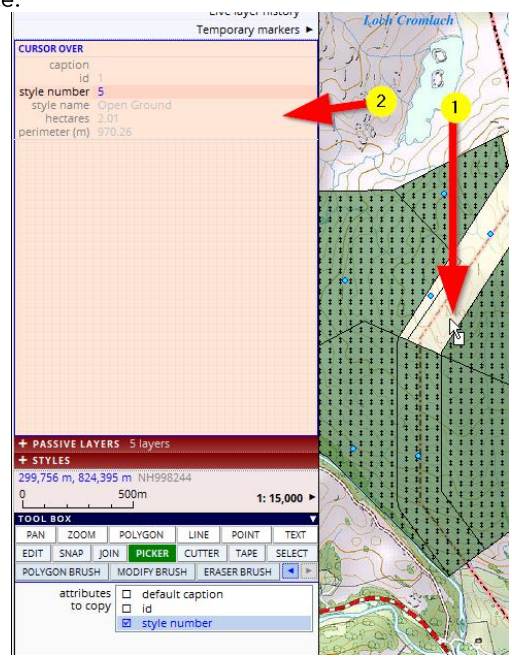
In our little example we are only interested in carrying over the style:

(1) Activate the PICKER tool
(2) We have no specific 'attribute data', and the ID's we will sort later, but make sure that the style number tick box is checked.
(3) Move your cursor over the polygon with the correct style and note how the cursor has changed into a little pipette, ready to soak up information.
(4) As mentioned before, note that the interface on the left, in the CURSOR OVER section, shows all that is on file for this particular object.

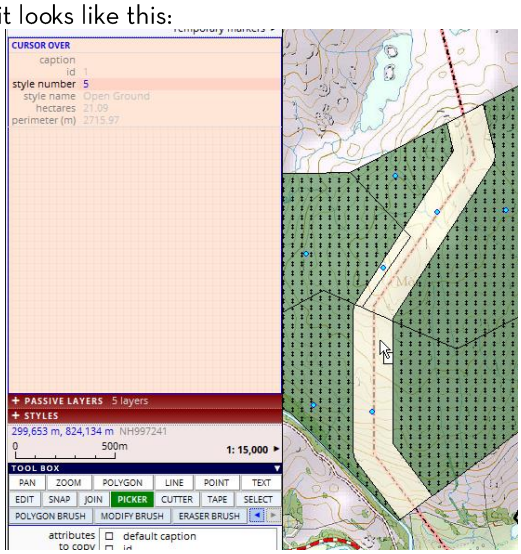


Then:

(1) *Click, hold and drag* to the next polygon and let go: that polygon will now have an identical set of information (and colour).
(2) Note that whilst you were moving the cursor to the next polygon, the interface changed colour indicating you have information 'in' the pipette.



Now that you have information in the pipette, you can click on any other polygon (without having to absorb - click & hold). Just click on any other polygon you would like to change. Experiment with it with the other polygons (and change them back again).
I will only do the third polygon so it looks like this:



Remember: these were only 3 polygons, but in real life you may be dealing with many more and a lot more 'attribute data' and then this tool is *super*-efficient.

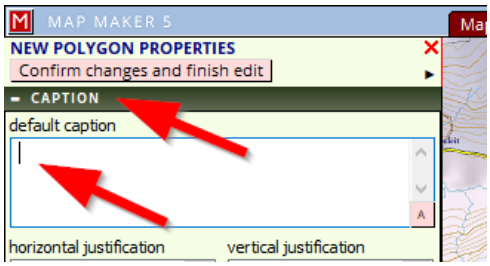
For the next exercise please change these three polygons back to what they were, the style and shape.

Let's have a look at another tool which is also a very efficient one when it comes to dealing with multiple map objects in one go:

9. LABELS

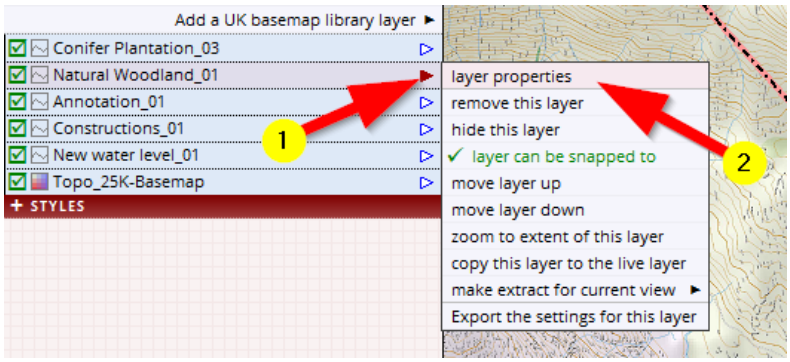
9.1 Show labels, types & options

We have seen we can give each map object a CAPTION, a name (in the new object menu or by accessing this menu again with the edit tool):



Each map object can be adjusted so that this name, this caption can be shown on screen. However, this is intelligent vector data, so we have more relevant information which might be useful to show on the map. For example, the location in the national grid (X,Y coordinates or UK OS ref) or the area involved, or *any* other 'Attribute data'.
When we show such information on the map, it is referred to in a generic term called 'Label'.

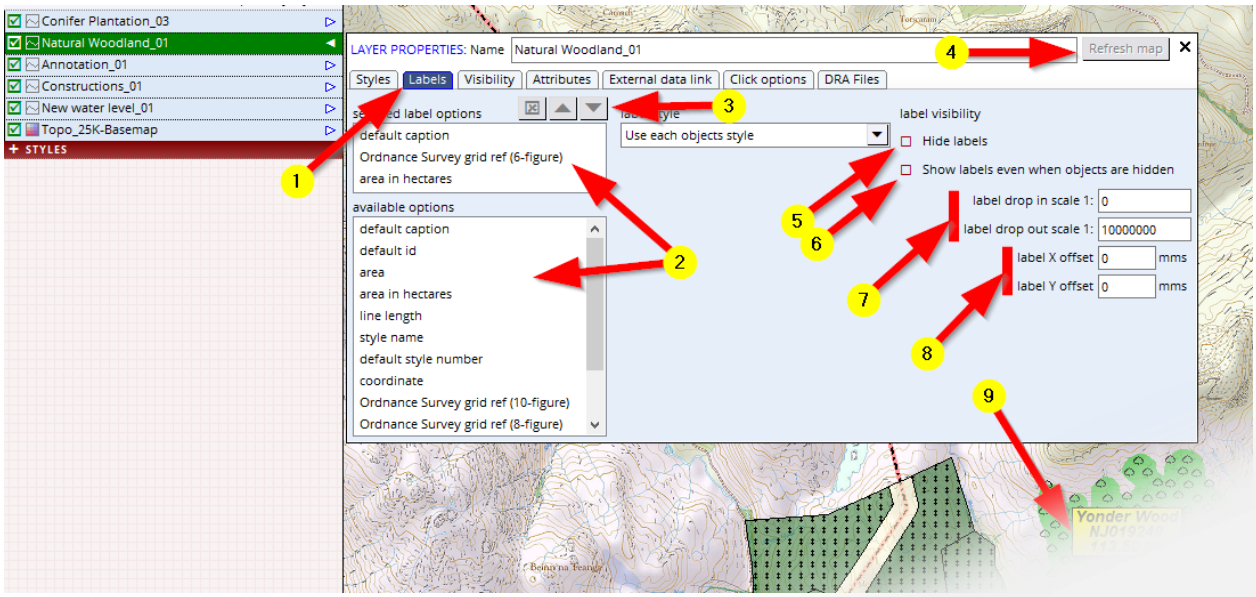
To see this label functionality in action, please select the layer 'Natural Woodland_01' in the PASSIVE LAYERS header.
(1) Click on the little blue arrow (which then turns red)
(2) Select the option layer properties



A new menu will open:

(1) Select the Labels tab
(2) Click on a specific label (or more than one) in the left list and it will appear in the right window.
Scroll down the list and see for example the option 'OS Field number' – UK Farmers and Land Agents will like this option. Any 'attribute' data (see later) can also be shown as a label once defined.

(3) The sequence in which the label options appear can be changed here (or delete an entry using the red **x**)
(4) Use the 'Refresh map' button to see the result on screen
(5) We can also hide *all* labels
(6) This is a setting which is useful in more complex GIS/map making work
(7) With these settings we can adjust a specific scale range in which the labels will be visible
(8) And with these settings we can move all labels in this one layer, globally, with a particular offset, as opposed to moving a label of one specific map object
(9) With my selected options I get this result.
And remember: the yellow panel was defined in the style set.



F1 to save your project.

The following three things are important to understand and remember:

1. Label setting can be found in the layer property menu for ... as passive layer. When we adjust these settings in the live ... change it again in these live layer settings.
   So whatever else we will be drawing ... this particular label will show. When we draw a polygon ... when we then create a new layer with lines and ... wrong. We can of course decide at any time to ...
2. Once a ... layer *will retain* the label settings which were ...

... copy a passive layer into the live layer to work ... carried over into the live layer settings.

... practice you might not even be aware of this behaviour

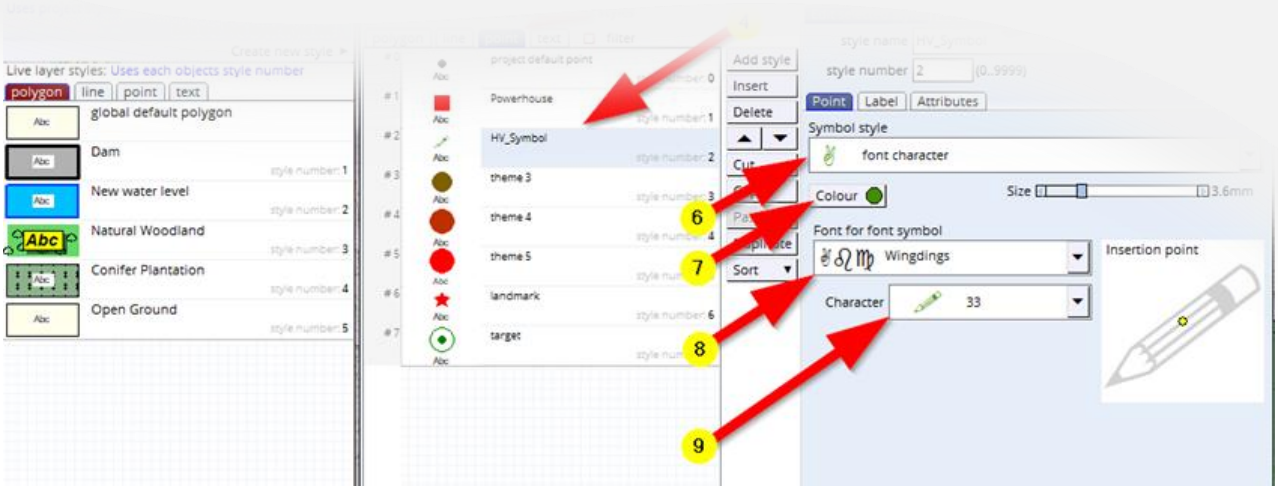
SESSION 6 – Custom Symbols

10. CUSTOM SYMBOLS

We want to warn folk who use the map that the power station with all the high voltage involved is actually a dangerous place to be. We want to insert a symbol on the map with the usual lightning bolt ( ).

10.1 Creating a custom symbol

To place a symbol on the map we need of course first to define a style in the style set. Here we go:
(1) Click on the STYLE header
(2) Edit project style
(3) point tab
(4) select an exising style which we don't use (e.g. 'theme 2')
(5) Change the name to e.g. High Voltage symbol: 'HV_symbol'
(6) Scoll down the list of the default MM5 symbols to find a suitable symbol. We will discover there is no such specific symbol pre-cooked for us. Fortunately, at the very bottom of this list we can see an option called: font character. This is good! Because in Windows there are several fonts which have all sorts of weird and colorful symbols.
(7) Set the colour to red
(8) Switched to use a font character, we must select a specific font. Windows has the so-called 'Wingdings' font. Select one of those.



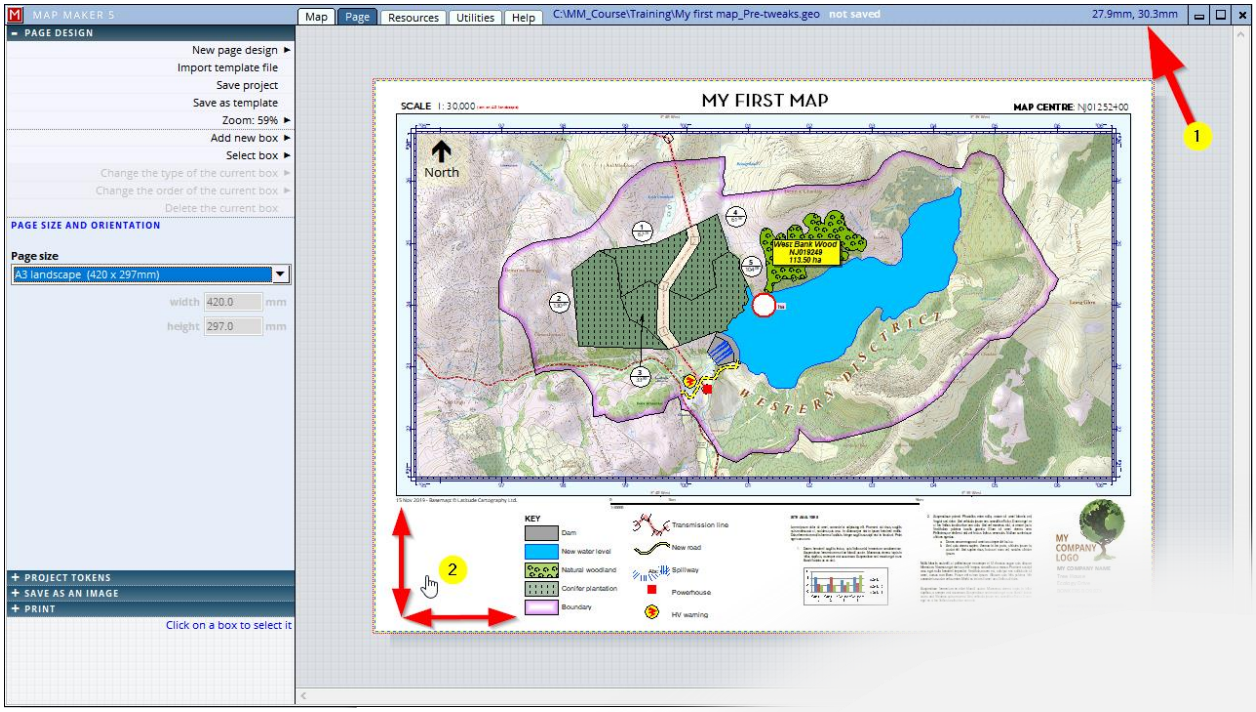
The symbol (lightning bolt) we have in mind is not in this font set. We could change the font and start looking in others. That takes time. Fortunately it is not a big deal to design our own symbol in MM5.
This is how it is done. Leave the style editor open.
With the opened style editor:

13. LOCATION MAP

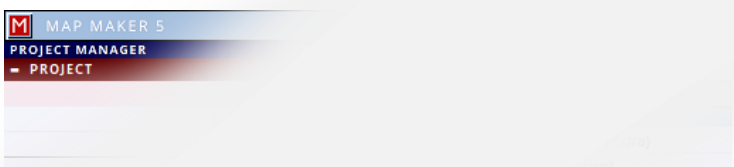
With maps like this it is good practice to include a location plan. We first need to whip one up! We will give two options to make one. The second one is particularly useful, spectacular even, for UK users.

13.1 Creation of a simple location plan – Personal data

Looking at the template it is clear this has to be a very small map. In the top right corner of the screen we can read in the X & Y 'coordinates' of the location of the cursor - in mm on paper- (1). By moving it into the place where the location map can go (2) we can get a feel how big the 'paper size' of it has got to be. We need to know that because we need to know roughly the scale we need to use for this map.



Now that we know the approx. size of this box (6 x 6cm) we ar
new project:



A location plan usually ing a dot or symbol marking the location. As it
ust get on screen as a first layer in this new blank

SESSION 9 – various

The following topics are beyond the scope of this beginners course, but even a few words might already open some more doors.

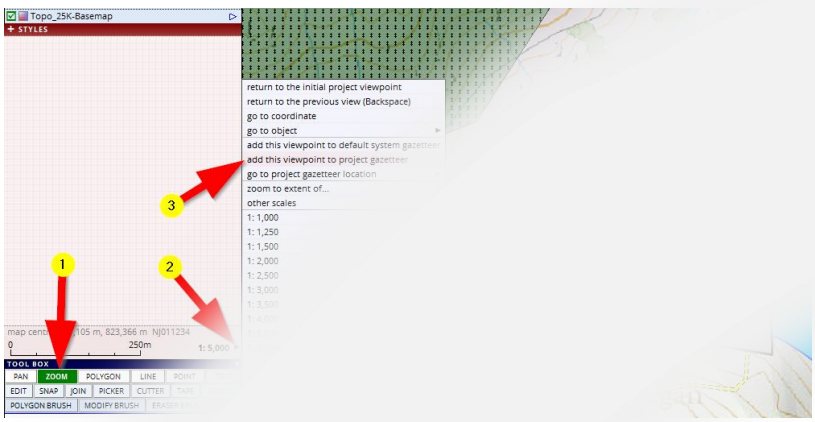
16. Useful extras

16.1 Gazetteers

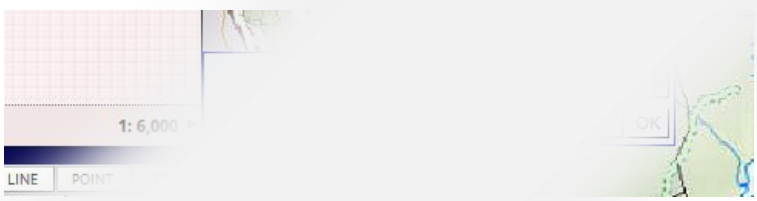
We have drawn several things in several locations. During this course we have been zooming in and out on specific locations and needed to pan the image quite a lot to go to different sites. OK, this is a small map and covering a relatively small area, but think big. We may be dealing with a large area showing e.g. many farms or tenants or woodlands. To navigate from one site to the other can take quite some time (especially if your computer is not all that fast). Also, some other users of this digital map might not know where all these different sites are.
To help navigate to specific locations on the map we can set up a so-called 'gazetteer'. A gazetteer is like a bookmark in your browser. It will allow us to mark a specific site and give it a name, after which this name appears in a 'pick list' so that the screen will automatically move to show this particular site at the scale we had it on screen when we saved the location in the gazetteer.
This is a very efficient navigation tool, a time saver and an aid for those not familiar with all the locations involved in a map. Furthermore, we can make good use of the gazetteer locations when it comes to printing multiple maps of the one site. Larger organisations or large estates will find this useful.

This is how it works:

(1) Activate the zoom tool and zoom in so that the dam is almost filling the screen
(2) Click on this little black arrow to open the next menu
(3) Activate the option add this viewpoint to project gazetteer



The interface changes, type in a name:



Do the same for some other

Yonder Wood
Conifer

17. ATTRIBUTE data

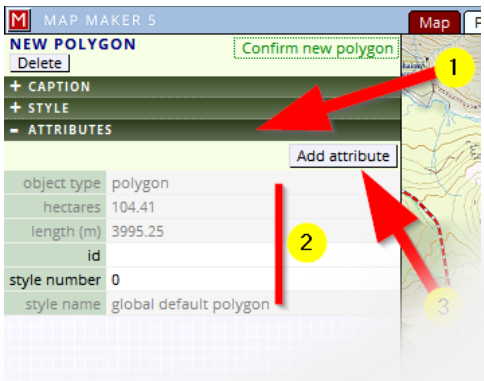
Again, it is not in the scope of this beginners book to dive into all this, but no harm to add few words on 'attribute data'.

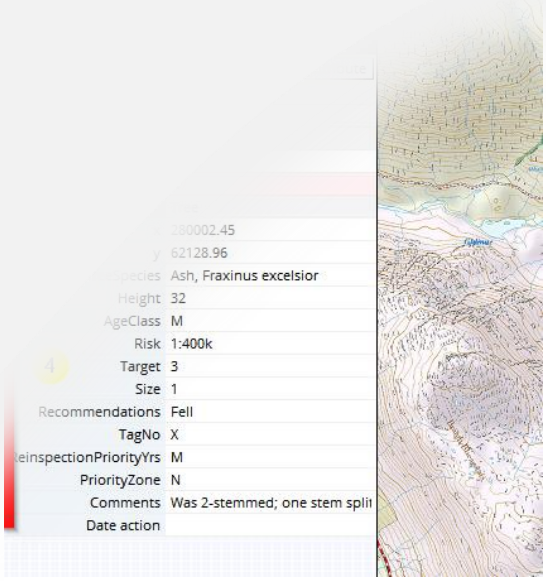
What is 'Attribute data'?
We have already ready seen the basics of this. When we draw a map object, the computer registers all sorts of additional data. For example it calculates and lists the area of polygons, the length of the perimeter. It can record a unique ID of any map feature and we can type in a name (Caption) and can assign a style number to it. That is computer related. However, a map is a 2D representation of real physical objects in the 3D world. All these objects will have lots of specific information which is also relevant to have on record.
For example:

Arboriculturalists may record in a tree survey:
tag number, species, condition, PofF, girth-width, age, risk, etc.
Ecologists may have done a heathland survey and would want to record e.g.:
survey date, the type of vegetation, health, wildlife seen on it, soil type, drainage.
Farmers would like to record e.g.:
crop, planting date, soil quality, applied fertilisation in an area.
Foresters are interested to know about e.g.:
species, plant year, yield class, thinning and felling phases, volume, tree heights.
Land Agents/Owners are interested in recording e.g.:
ownership (trusts), conveyance numbers, tenant details, rights, constraints.

In short, the usual stuff. In other words these are 'Attributes' of an object. This data can be
drawn map objects.

In several places in the interface we have seen the ATTRIBUTES header. For exa
edit an existing one or select an object(1). As mentioned: the software
information as can be seen in the highlighted section (2).





which then show up here (4).

A3 Glitches in software

We all like to have software that just works. But 'glitches' in software seem to be unavoidable. Software, by its very nature, is based on extremely complex programming and lots can go wrong.
Some examples: MS Windows issues updates each month and those are not only to install additional functionality, these updates include 'patches' to fix glitches. My version of MS Word freezes on me periodically. The printer driver software of one of the most prominent printer manufacturers has glitches. A while ago I noticed ArcView did not show a normal aerial photograph well on screen, QGIS has got glitches. And this list goes on.
Usually such glitches are not 'life threatening' or 'show stoppers'. It is always beneficial to report glitches to the developers.
Ironically, it would almost seem that the larger the company is, or the larger the 'supporting' community is which develops the software, the longer it takes to get a fix for a glitch.
Unlike a package such as MS Word which deals with limited data, GIS software interacts with many different file formats. The variety of file formats increases the likelihood of glitches.

Glitch Protocol
When one experiences odd behaviour in software, to narrow down the fault, a standard protocol is this:

1. Try it again.
   (it could be user error)
2. If it persists, try it again but on a different file, a different project, different data.
   (it could be that in the current data set, things are somehow corrupt or off beat)
3. If it persists, close the software down and try it again.
   (it could be that the software is simply in a twist and that this mishap is a temporary phenomenon)
4. If it persists, reboot the computer and try it again.
   (it could be your computer is in a twist and a reboot might reset things)
5. If it persists, try it (if possible) on a different computer or ask a colleague to try it.
   (it could be your computer e.g. it needs a later Windows instalment).
6. If the error persists: download and install the latest version of that software when possible.
   (it could be that this glitch has been reported by others and that it already has been fixed in the latest version.)
7. If the error persists even after installing this latest version and all of the above tests have been tried: report the glitch to the developers and try to be as specific as possible explaining the exact steps which lead up to the glitch.

These are software independent observations and this is a solid general protocol. It is equally applicable for the Map Maker 5 software.

A4 Where to find or buy map data

There is a lot of map data available on the internet which can be accessed or downloaded.
Paid for data can be ordered on-line and can be downloaded within minutes. A lot of governmental organisations share some of their data for free. Even commercial organisations offer free map data. Companies like Google, Bing and ESRI (ArcGIS) also host a web service with useful data e.g. worldwide aerial/satellite imagery.

Then there is for example the impressive Open Street Map initiative. This is a dataset produced by volunteers using their hobby GPS kit and Bing aerial photography to create an interesting world covering topographic map which can be made use off in various beautiful lay-outs. In some urban areas the information collected rivals (if not surpasses) that of National Mapping Agencies. There is even talk of such agencies incorporating this data into their data sets! Naturally accuracy and reliability of such data is an issue. But there you have it, a blurring of free and paid for data.
The fact that modern mapping/GIS software offers access to such datasets does not mean the user can use it for whatever purpose. All this data is copyright protected (even the free Open Street Map data). The Bing aerial photography can only be used in a professional way to feed the Open Street Map project. The aerial/satellite photography of Google and ArcGIS is governed by very strict terms of use. The onus is on the user and not the mapping/GIS software provider to adhere to these copyrights and these terms.

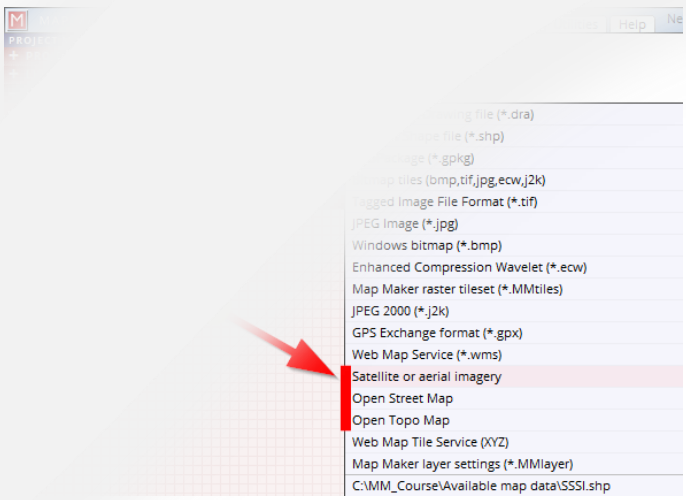
It is tempting to open up for example free satellite imagery and just make use of it as you sees fit. But beware, it is like a jewellers displaying their jewels on a table in front of their shop window on the pavement. Unattended, with a big advertising sign: "FREE JEWELS" and a sub-tile "Feel free to touch and look". And then in tiny print which can only be read with a magnifying glass: "ask inside for assistance" . The jeweller expects us to pop inside, ask for the copyright statements and terms of use. Which clearly states that the diamonds may only be looked at, be handled with gloves, and only in the presents of the jeweller. How on earth could you ever [illegible] home a diamond off that table... Not so long ago this would have been called 'incite[illegible]' changing world this seems quite acceptable.

Also, try to find out the date the data was captured/collected: a key elem[illegible] photography is usually out of date.

In short: it is essential to know where the data comes from, its dat[illegible] statements to ward off the first round of potential legal claims aga[illegible]

Add free base layers in MM5

MM5 offers quick access to free online aerial photography and two renditions of the Open Street Map project:
(1) In the PASSIVE LAYER header, select Add file [illegible] as a layer
(2) Select one of these options e.g. Sat[illegible] imagery



It is recommended to [illegible] *bination with our course data, that although our course data is*

Note: a PDF file with hyperlinks to the websites mentioned in this Appendix can be found in the 'My data' folder; ***Links.pdf***

Free UK data

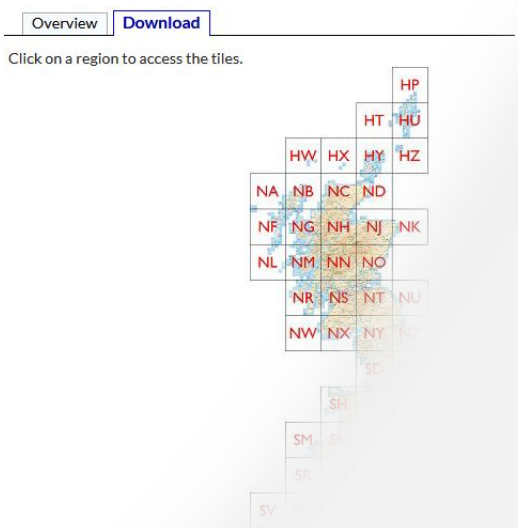
The Ordnance Survey used to be a governmental organisation but a few decades ago it became a commercial enterprise. That meant that taxpayers who now wanted to use maps of their own country had funded through tax have to pay for it again. And once all became digital, the end-user had to pay licence fees on top of that.

Under pressure from various organisation the OS was forced to release data for free. They cleverly released quite a lot of data but not the highly detailed map data most people want. Still it is a good beginning.

It is truly impressive how accessible and fast their web-services and map

1. MapMaker.com download

The developers of Map Maker processed several datasets and made downloadable zip files. Please visit their website www.mapmaker.com and find your way to the 'Base-map' download section. The maps are all in raster file format. The zip file will contain several files but the file in '**tif**' format (shown below) is an interesting map backdrop which particularly useful:



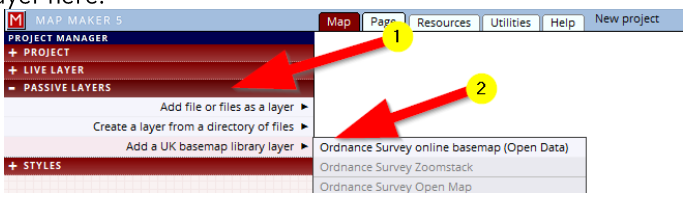
be used for many project. It is a very practical 'first port of call' base layer.

set is that it combines various OS data layers into this one map, a combination not

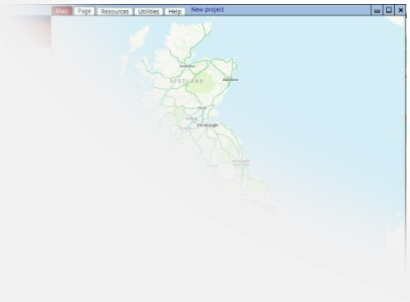
2. OS web server

This dataset can be accessed through the OS Web servers. It is fast and has different 'zoom levels' which are interesting to use as location maps. This dataset *does not* show all the detail which the Map Maker processed downloadable version has but the advantage is that the entire UK can be loaded as a single layer. The file format developed for this is superfast, but all depends on the speed of your broadband.

It can be introduced as a layer here:



Note: This menu option is by default only visible in the interface for UK users, a change in the system settings can be made so that international users can also have access to this data should there be a need to.



With every zoom, a new set of tiles will have

course data is

3. OS Open Zoomstack

The above mentioned maps are

'vector data' can have attribute data - we

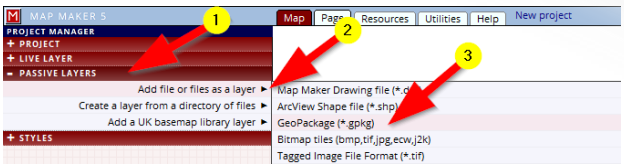
single file (11Gb!) which can be downloaded from

https://www.ordnancesurvey.co.uk/business-government/products/

Once unzipped we can add relevant map data (which is served up in different layers)

This file can be added as a normal vector layer. Browse to the folder where it was saved

'**GeoPackage' (*.gpkg)**.



It is prudent to *first zoom into your project area* before activating any of the vector layers - it will reduce the waiting time for all the data to load.

We need to create styles for each layer, but it is vector data, which means we can get it into the live layer as well through the selection tool (SELECT, ACTIONS, Copy selection to the live layer).

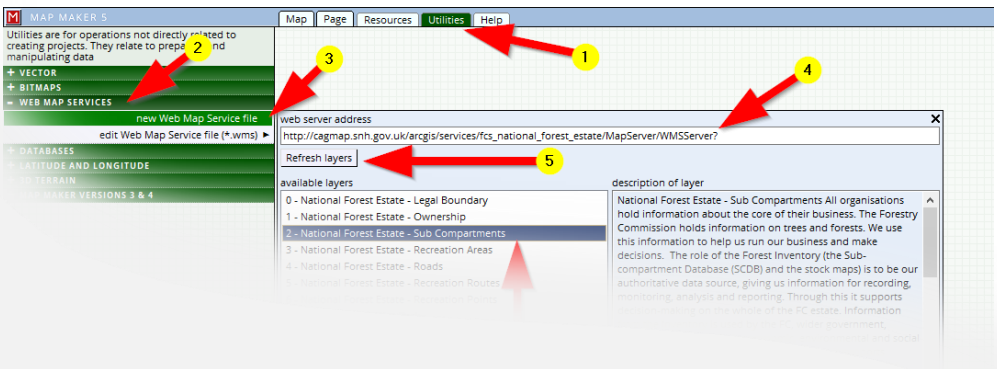
4. Web Map Services
Again the disclaimer: it is beyond the scope of this beginners course, but I will point you in this direction nevertheless with only a few words:

Various institutes and organisations have a lot of map data which they happily share through their web servers. An industry standard exchange protocol was developed, and in MM5 we have the tools to make use of these services.

In Utilities we find the option Web Map Services (1-2). In it we can create a new ***.wms** file.
Here is an example of the UK Forestry Commission:

http://cagmap.snh.gov.uk/arcgis/services/fcs_national_forest_estate/MapServer/WMSServer?

(3)Activate the option: new Web Map Service files
(4) (usually copy and paste) the given URL link into this command line
(5) Refresh layers
(6) Available layers will be listed (if the link is valid)
(7) An explanation of the content of this layer is often shown in this section
(8) Save this file



5. Governmental data
A lot of officially released 'land management data' can be sourced here:

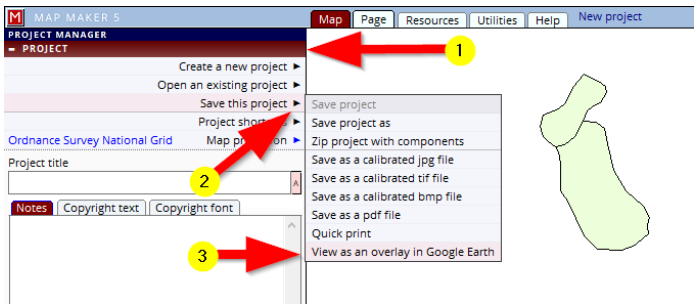
England: https://magic.defra.gov.uk/

Scotland: https://gateway.snh.gov.uk/natural-spaces/wms.jsp

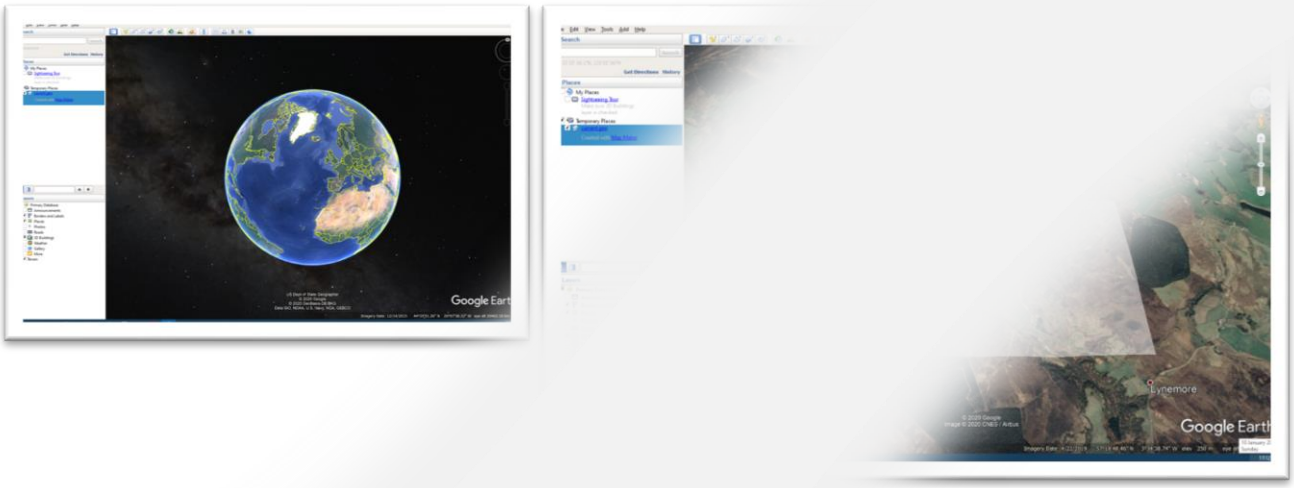
6. Google Earth

I recommend installing Google Earth. It is free, and Map Maker 5 offers a neat interaction with this software.

Whenever we have a map on screen and have taken care of our map projections we can view our work on the satellite imagery which Google Earth has on file.



Google Earth will fire up and zoom in automatically to this area:



Pan or zoom in a little than tap the 'u' [illegible] the view from oblique to a vertical view. We can now turn our MM5 [illegible]

Note: The Base-map in [illegible] Scotland, overlaying our fictional map in Google Earth will [illegible]

A6 Mapping software (a brief review)

In this course we use the software Map Maker 5. And for good reasons: it is the most user friendly package around and quite possibly offers most, most, if not all, any novice, occasional, fulltime map maker or Geographic Information System (GIS) user would need.

Disclaimers

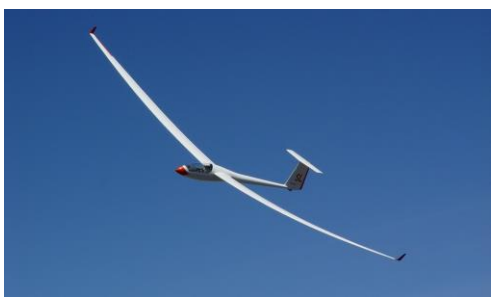
There are more packages to consider and since we are map makers, let's '*put these packages on a map*!'

1. Because there are so many different packages and we only have limited space, it has got to be a small scale map, like a road map. The nature of a small scale map is that some features, like main roads, are exaggerated to make them very clear, while other features, like buildings, are displaced to leave room for, let's say, wider road lines. And finer detail...? Well, that is left out altogether. That is all OK, since it is just a small scale map and serves a specific purpose. This simplification process is called 'generalisation'.
Since this is a map making course, we will apply these 'generalisation principles' to 'map-out' some software options knowing we fall short on finer detail.
2. The second disclaimer is this: I have no commercial interest in any of the mentioned packages. I am an independent professional map maker/cartographer and GIS user. I simply need good and efficient tools to earn a living. As such I keep an eye open for good tools of the trade.
3. The third disclaimer is this: I have tested a number of packages but most certainly not all of them.

Analogy

To start digital map making I often hear a statement like: *"I only need to draw a few lines on a map and print them, that is all, no bells and whistles, for me that would be too complex, I don't need that anyway".*

Sure, that is simple enough. And easy-to-use software will see you through it in no time. It is an easy process. We all like to do that, fly from A to B, in a simple, elegant and efficient fashion:



But guaranteed: *no sooner* are we airborne (and one realises how easy it is) and then...
the **Farm manager,** also using the software says, "yeah, great, I can do this!" Now I *also* want to spray my crops...

After those skills are mastered (it is easy) the **Forester** has some additional specific needs:

The **Marine Biologist** or **Ecologist** having learned these easy basics, now wants to approach this map just a tad differently:

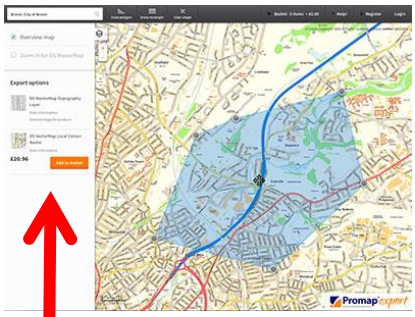
After the first maps are made, the **Land Agents**, the self-employed and those multi-tasking will soon want some serious oomph:

whilst those working in larger organisations really need something big to transport bulk data:

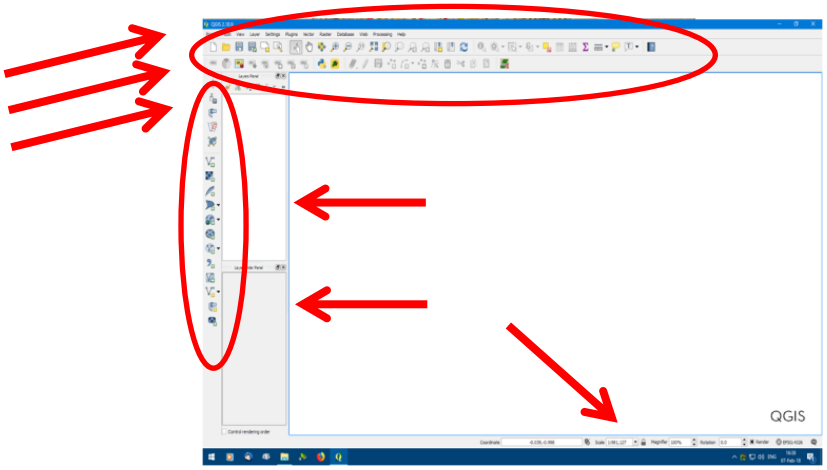
...by now it has become a *three* man job to fly or land the jolly thing...!

The functionality of these aircraft is often reflected in the increasing number of controls in the cockpit:

Translating this back to software interfaces it can range from something as simple as this:



...to something more complex like this:



As said: this is usually how it goes: "I ***only*** want something simple...", and as soon as it is mastered, more is required...

Naturally each of these aircraft has their strengths and weaknesses and each comes with a different price tag. So how do we narrow down what we really need and want?

Let me 'generalise' these choices, and simplify the matter. Let's squeeze the map making/GIS software packages unreverentially into only two groups:

- One-trick ponies
- Industry Standard packages

One-trick Ponies can be very efficient, slick and easy to use – but offer little flexibility.
Industry Standard packages offer immense flexibility but there is more to learn.

a One-trick ponies & horses for courses – considerations:

Import-Export
In the early days of working with digital map data (and computing in general) the software packages often tied the user into their brand and way of working. *This is in general no longer the case*. There are industry standard file formats and *any* good package will be able to import and export data, making use of these standard file formats. To create maps and map data/layers is a time consuming activity and if a particular software package does *not* allow you to export your data to these industry standards (ArcGIS at the least) I'd be reluctant to use it, however tempting it may seem.

Security
Although most packages will allow exporting your data to be used in another package, a new phenomenon is emerging. Some packages are web-based. The user can no longer physically download and install the software on their PC and in some cases the data which you draw lives somewhere in 'the cloud' on their servers. And that means *you are tied into their regime*. Furthermore, anything digital can be hacked, no matter how big the firm is and no matter how well the security measures are advertised (think of incidents with Google, Facebook etc.). The bulk of produced map layers may perhaps not contain super sensitive data, but think of the time it took to create them, and then you don't mind being dependent on an external supplier to access your data...?

Costs
The cost of using such online/on demand software seems small and can, for example be charged per print, reducing the cost to a bare minimum... or so it seems. However, you will soon find out that in fact you need a lot of prints, not only to make a high quality map but also in daily use. And then the costs of using these seemingly cheap packages and services mount, little by little, bit by bit.

Quality of output
The map is often your 'visual-end-output' of a costly and/or time-consuming project (like a field survey which took days and cost a fair bit). Or it *may lead* to a costly and time consuming new project: sale of land, grant applications, planning permissions etc. In other words, the map is a key component in the presentation of your information. If you fail to present it well your project may miss its aim.

The creators of these on-line packages are often keen to promote their services and so their names and logos may show up clearly on your work. Furthermore, drawing a digital map is more than just some basic colours or pattern fills. You are communicating valuable information on your map and so you need control over its appearance. 'One-trick pony' software often offers easy access to a few default and standard lines and colours – but that's it, little creative/personal control.
Bear this in mind when producing map output for your valuable and specific project.

Ease of use
These 'One-trick pony' packages can be (or should be!) very efficient and most user-friendly. That is to be expected because they only do a few things so there is little to do and learn. But from experience I know that as soon as you are over the initial hurdle of the complexities of map making and you know how to draw a few lines with these basic colours and tools, I repeat, *NO SOONER* have you learned that and you will ask, "can it also do this...?", or, "I want it to look like so...". And then the answer is, "no, it can't be done because this is a basic package". And then you start looking for other software and waste more time and money to find something that does work for you.

Dedicated packages
Then there are mapping tools which are developed by service providers who operate in a specific 'non-map-making' market and realise that offering mapping capabilities enhances their core product. Think of forestry management software, terrier software, property maintenance software etc. Such mapping tools are often, again, easy to use as they are an efficient match for their core activities. To be able to program a smart administrative/management database package is one thing, to develop a proper mapping/GIS package is of course a totally different ballgame. So, mapping software like this might be efficient and practical however, it too is, in a way, a 'one-trick-pony' and is no match for software which is specifically developed for mapmaking/GIS use.

b Industry leading packages

On the other end of the spectrum are the big serious mapping/GIS software packages. There are quite a few about, and we will only touch upon the most well-known:

ArcGIS, QGIS etc.

The undisputed market leader in GIS software packages is '**ArcGIS**'. In hot pursuit we find rival packages like '**MapInfo**' Bentley's **MicroStation**, **AutoCAD** etc. The first two are like Coca-Cola and Pepsi, they have conquered and divided the world between them. Big, formal organisations are making use of packages like these.

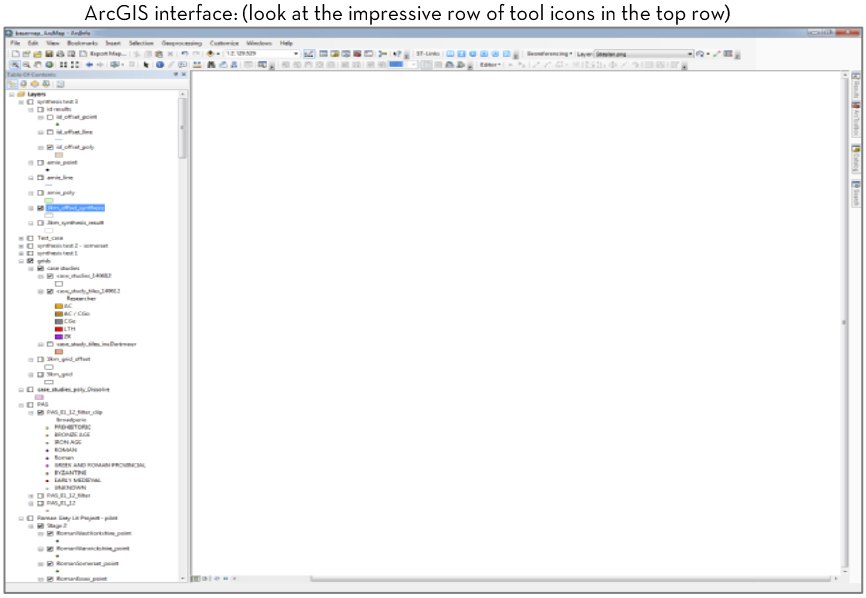
These packages rule the world because they are good, are well known and are a standard.

> **If**, for example, you ever need to dig open a road to replace a cable and want to coordinate this with all other utility services, have all their data on your mobile and have it projected in your Google Virtual Augmented glasses so you can see in 3D where the cables are whilst looking at that road,
> **then** these are the tools which offer the integrated app and functionality to do all that. Mind-boggling and spectacular.

But like the aforementioned sugar soft drinks, though they may rule the world, it does not mean they are all that healthy for you too.

Packages like this come with a hefty price tag. 4 digit numbers for a single PC licence followed by annual licence fees. An office license will have a price tag of 5 digits + annual licence fees, and then it is not uncommon you need an extra module to do this and another to do that...
Because they serve the entire world with all its GIS needs, the learning curve to master these excellent tools is steep indeed.

ArcGIS interface: (look at the impressive row of tool icons in the top row)



In short, *these are tools for people who are happy to spend money and have the time to learn.*

The times they are a changing...

But even amongst the big formal corporate users things are changing. For example, the Norwegian *National Mapping Agency* which serves up their maps through web-portals to a range of other organisations and users, have opted for 'Open-Source' software to provide these services.
'Open-Source' software is, of course, free. It is programmed by a collective of enthusiasts, professionals and/or hobbyists. We all know about 'free' software which we can download from obscure webpages covered in advertisements, so that we first download and install 3 packages we don't really want. We end up with a polluted computer and eventually discovering the free software which we thought would do the trick does not quite deliver as expected. And yet, here we are, Open-Source software in use in a very formal and secure, national institute.
Enter:

QGIS

'Quantum GIS' saw the light of day as recently as 2002 and became Open-Source in 2009. Initially it was basic and not all that impressive. However, 10 years have passed and the GIS community has pushed it to spectacular heights. It now is even becoming a serious rival to the likes of ArcGIS!

QGIS is a totally free and excellent package with functionality to make your head spin. And that shows in the interface, the icons and menu settings one needs to learn how to apply all this wonderful functionality.

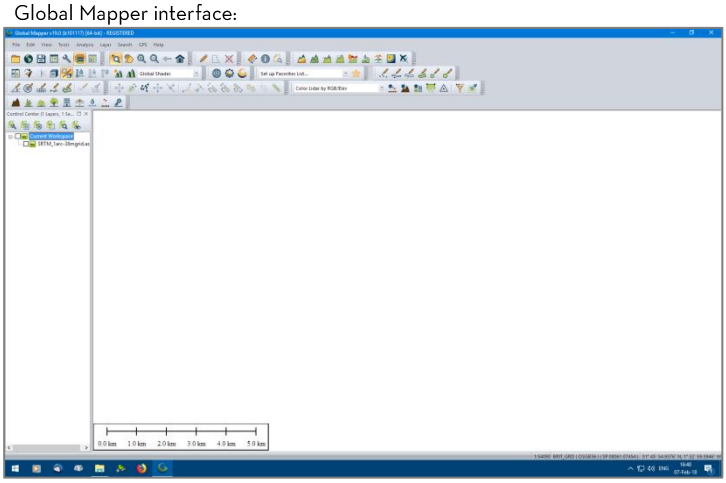
This is an excellent package particularly for those who enjoy nuts and bolts and appreciate a challenge.

Others well worth mentioning

Then there are packages which have found their way in to the mapping/GIS world through the graphic design sector. Graphic designers and artists can draw. And therefore they can make beautiful looking maps, but not necessarily *accurate* maps! The world leading graphic design package is Adobe Illustrator. However, there is more involved in a good map than just stunning graphics. And so an 'add on' package was developed by another company (Avenza) which now serves the GIS world in an impressive way: **MAPublisher**. It is based on Adobe Illustrator, and that runs on a *monthly license*, two packages in one, a lot of functionality, a lot to learn.

OCAD is a well-known mapping package in the orienteering world (hobby). **Global Mapper** is particularly strong in using Lidar Data.

Global Mapper interface:



And so the list of good packages can go on and on.

Plotting their basic functionality on our generalised road map – scale 1:250,000, we can note that (more or less):

- Nowadays all of these packages do more or less the same tasks. The core difference is that by their initial design some do specific things more elegantly than others.

- Furthermore, an important thing to realise is this: GIS packages are often designed to manage, analyse and work with existing data. To actually draw and make new maps is something different.

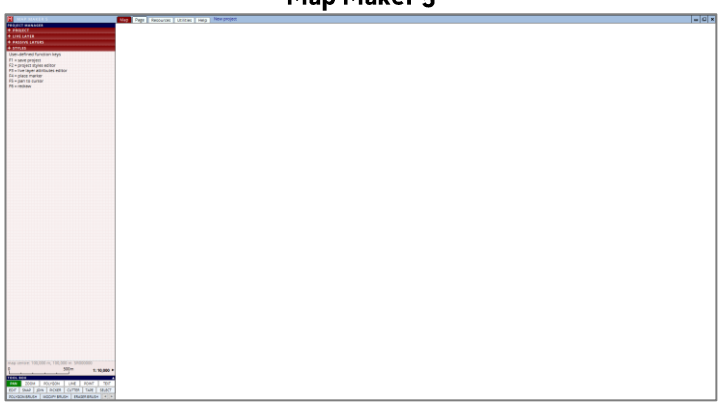
Then there is...

Map Maker 5

Map Maker 5 is the software which we use in this course. It was developed in the mid-90's for a particular target group: those working in international development. It was recognised that good maps are often a foundation brick for proper sustainable development and that, at that time, digital tools were not available for or those working out in the field.
The software had to be super user-friendly - after all, not everyone is a GIS expert. It had to be affordable and practical and had to have most tools a professional out in the field might need.

You may find it hard to believe, but as a professional map maker working across the board, serving many very diverse clients, making simple maps and working with complex and huge data sets: in the last *20 years* Map Maker has not let me down once! It spans it all, taking you with ease and in a most user-friendly way from A to B:

Map Maker 5



Map Maker 5 interface

The cost is little, probably as much as filling up your car a few times. It is a one-off payment, no dreaded accumulating monthly subscription fees (check out their website: www.mapmaker.com).

Map Maker Version 3.5 became very popular worldwide because of its impressive set of tools. It has always operated on the cutting edge of what technically was possible. And, speaking about 'cutting edge', the seemingly simple 'cutter' tool was such an example. It was in MM right from the beginning (mid-90's), ArcGIS only introduced a similar tool in about 2012! That is an impressive head start.)
The interface has always been most user-friendly whilst its applications have been formidable.

For example:

- I have trained for example land owners and agents; farmers; foresters; doctors; ecologists; marine-biologists; government officials and various hobbyists.
- I have implemented Map Maker 5 as a very efficient mapping tool / GIS at many estates and land management firms.
- In the early years, about 1800 farmers in Central America used a free Spanish version of Map Maker.
- In 2016 I was told that 95% of all government organisations in Ghana who used GIS tools were using the Map Maker software. That is impressive. Don't dismiss this thinking it just being a developing country, it is not. They have online map based, planning application web-portals etc.

It is impressive that Map Maker can serve this many different users.

That was version 3.5. We are now looking at version 5! Again, cutting edge. For example, I have not yet seen the super-efficient 'brush tool' functionality in any other GIS package yet. In terms of **user-friendliness** it has left ArcGIS and QGIS far behind.
As a professional, I need efficient tools and therefore I use Map Maker. I have found that working with small or super-large datasets or complex GIS/map making work, Map Maker 5 is equal to, if not outperforming, other packages.

Map Maker has remained true to its initial concepts: it is easy to use for anyone and yet it covers all the tools we need today to draw, analyse and manage maps, both for the occasional map maker, the full time map maker, as well as larger organisations.

Map Maker 5 updates & maintenance

Once installed the software runs for 30 days with its full functionality. After that it reduces the functionality to a pragmatic set of core tools.
The software is continuously being improved, expanded and enhanced. Registered users who want the most up-to-date version of the software, should periodically download and install the latest update free of charge. There are no set times for such releases, they appear as they are completed. In the Help tab one can see if there is a new update available, clicking on that notification will download and will start up the installation of the latest version.

Map Maker 5 and SHP files
Because ArcView 'rules the world', Map Maker 5 works seamlessly with SHP files. One can read and write to this file format without the need to go through an import or export routine.

OK, although it is a brief generalised software overview, it is quite a thumbs up for Map Maker. I am an independent map maker, as soon as there is a package on the market which is better and more efficient (I need to make a living with it) I will consider changing my preferred tool. For many years Map Maker has been the best choice for me and many of my clients, I can recommend it.