

MVL Utility

(Make Viewport and Layout)

Working as a road designer, I always find myself at the end of a project in the situation of creating tens or hundreds of plans and profiles along the designed route. This is a time consuming activity when you are working in simple Autocad since you have to create a layout for each and every plan manually : create a layout, make a viewport , scale and align the content and so forward again and again ... I find that doing all this in plain Autocad is a bit challenging for inexperienced users and also it's a trial and error process since you can't see "the whole picture" when you make a viewport, by that I refer to all that aligning, scaling and panning in the MSPACE of the layout to get all the content needed inside the viewport .

As I was reading the CadTools forum (CadTools (ToolBox) is a small but powerful free software developed for Civil Engineers that work with Autocad, with many useful extra commands , created by Lars Glamsen) I stumbled across a request for a function that overcomes the problems listed above and since I had just started learning AutoLISP a week earlier I thought it would be a great opportunity for me to get involved in a project that would make learning much more fun and with an useful ending.

So I started to put my idea for this function on paper and with the LISP guides by my side I started coding. After one week of hard work, I had a working function! But I wanted more simplicity and a smoother operation (the first function was working with Command Line input) so I started developing further to add a settings menu and more features.

After even more work (more work is never enough!!!) I finished what I had in mind and there it is: the MVL Utility.

In the next lines I wrote a walkthrough for this utility. So let's start!

MVL Utility is composed of two files :

- MVL.vlx – the main utility
- MVL.cui – a menu (not required to function but some people don't like using the command line...)

Assuming that you already know how to load those files, I'll go straight into the description of the utility.

A. The settings menu (Command : MVLSET)

1. Drawing units

Drawing units refers to the unit you use in your design. Since Autocad has a generic "unit" format everyone considers that unit as needed : meters for civil design or millimeters for steel works for example, so you need to specify it in order to get the other settings right.

I only added support for meters, centimeters and millimeters since those are the most commonly used.

There is no support for imperial units and there will never be any! Well ... unless I get paid to do that!

2. Drawing scale

There's not much to say about this, just that you can set the scale as 1 : nnn or nnn : 1 , or even something like 3 : 517 ... although I don't think that would be of any use.

3. Paper orientation

Also not much to tell about this either ...it's just a matter of selecting between Landscape or Portrait orientation.

4. Paper size

And again no support for imperial stuff! Just the most used ISO formats: A0 to A4 and custom formats defined in millimeters.

5. Paper margins

Here you set the paper margins for the resulting plan in the layout. This will actually be the distances from the paper margins to the inside border of the plan – the drawing area. This will also set the size of the viewport since the viewport is fitted to the drawing area of the plan. More on this topic in the explanation of the function.

6. Insert title block

I added this function at the last moment so I think it could have been better but for now it works. Through this option you can select a title block to be inserted in every plan created with the MVL function.

When you check the toggle "Insert title block" the options are activated:

- press the “Select title block” to enter the menu for block selection
 - click on the “...” browse button to bring up the standard AutoCAD file dialogue box.
- Note: The selection is locked to the .dwg filetype and you should not attempt to load .dwg files that are not created as exported blocks since they won't have an insertion point and it will crash the program.**
- select the block , click “Open” an then “OK” in the previous menu and the path and name oh the block will a appear in the main menu in the “Selected Block” edit box.
 - select the insertion corner for the title block.

The “Insertion corner” is one of the four corners of the drawing area (paper size minus the paper margins).

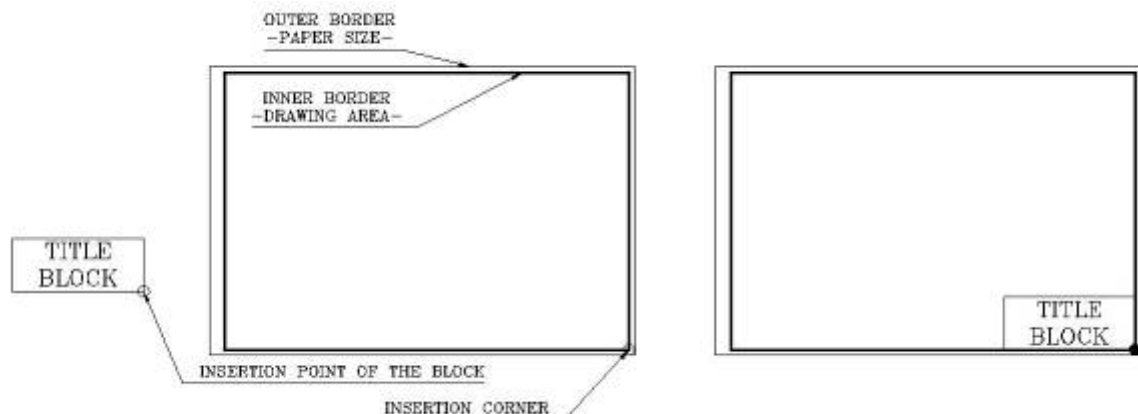
There are some more things to say about on this topic.

This option was intended for title block insertion but you can use it to insert any other block in the created plans. In the future I'll try to add an option for inserting multiple blocks at once (a legend or something else).

All the blocks inserted must be drawn in millimeters!

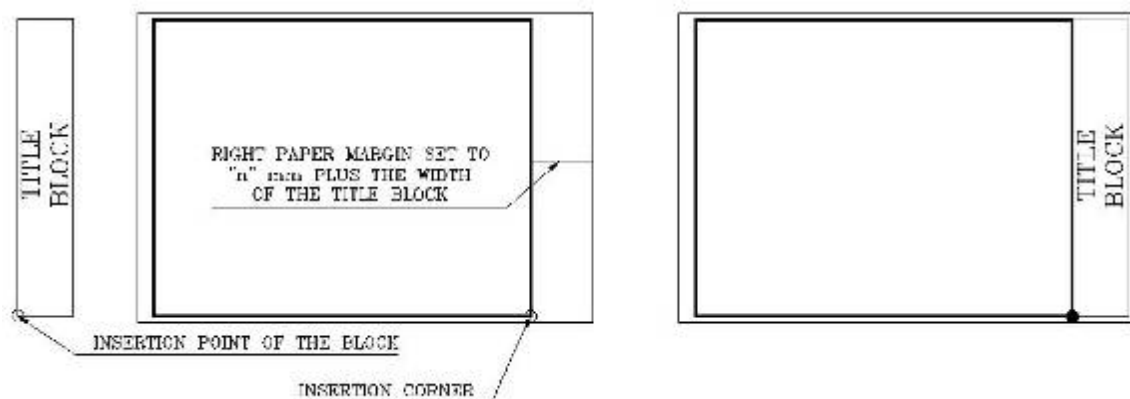
I took this decision for consistency reasons and the insertion temporarily modifies the INSUNITS variable to millimeters so you won't have a surprise with block scaling.

The function is intended to insert the blocks in the drawing area (paper size minus the paper margins) but you can add them on the page border also. It's just a matter of matching the insertion point of the block with the corner selected in the settings menu.



I recommend you to place a white solid hatch as background in the title block so if there is any content in the drawing area (viewport) underneath it, the hatch would cover it.

As for vertical title blocks I thought of this method :



Because the viewport is fitted to the drawing area, a vertical title block could cover an important part of the content and mess up the overlapping of the plans along a path. So it's better to place it outside the drawing area by adding to the usual paper margin the width of the title block and matching well the insertion point and the insertion corner.

The title block is inserted as an XREF so if you ever stumble upon a situation where you need to replace part of the content (ex: ROAD REHABILITATION - KM 0+000 - 25+000 instead of ROAD REHABILITATION - KM 0+000 - 24+500) you don't have to make the modification for each layout or even other dwg files, just make the replacement in the dwg containing the title block and update the XREF link.

Name differently the dwg files containing different title blocks used in a project otherwise when you insert more than one type of title block in the same file you will overwrite the previous one and mess up the plans.

Caution! Don't leave the "Insert title block" toggle checked unless you specify a valid block otherwise the program will crash! I'll fix that in the near future but for now just be cautious.

7. Known issues (to be fixed in the near future – I would appreciate very much some feedback from any user about other issues they find !)

- Be careful when inserting values in the edit boxes (Drawing scale, Paper margins)! Inserting letters instead of numbers could crash the program because a letter is interpreted as "0" (zero value). Ex: if drawing scale is set to 1 :p this would mean 1/0 (zero) and it would trigger a "divide by zero" condition.
- The values for "Custom paper size" and "Paper margins" must be inserted in millimeters as specified in the menu.
- Don't leave the "Insert title block" toggle checked unless you specify a valid block otherwise the program will crash.
- Make sure you set the right drawing unit.

B. The function (Command : MVL)

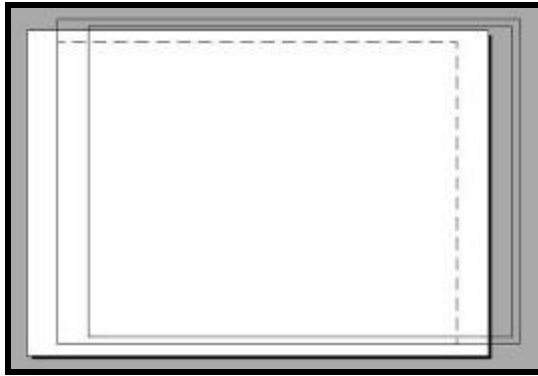
First thing to do before you start the MVL function is ... more settings!

Select a layout and rename it as "planseed1" for example and in the "Page setup manager" set all the parameters needed for the plans to be created (select .ctb, printer, paper size, orientation and other stuff). This layout will be used as a "seed" for the first layout created and the next one will be a copy (same settings not same content!) of the latter and so on. More on this later in the description.

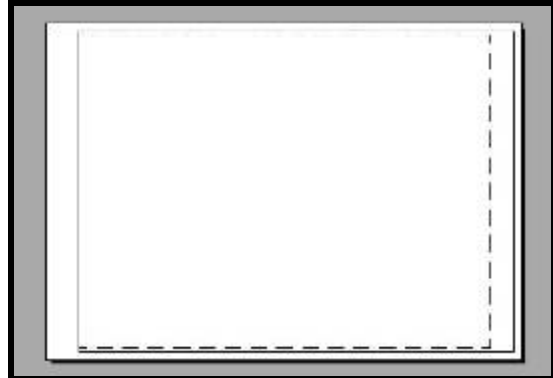
Be sure to do the next things:

- **select "Layout" in the "What to plot" section**
- **set "Plot scale" to 1:1**
- **in Autocad "Options" menu, in the "Plot and Publish" tab, set the "Specify plot offset relative to" – "Edge of paper" and in the "Page Setup Manager" reset the "Plot offset values" to X=0 and Y=0 to properly align the paper border and viewport created by MVL with the paper sheet inside the layout! Otherwise the bottom left corner of the plan created would be inserted in the point described by the offset values – that would be the bottom left corner of the printable area on standard settings! You could try not to change this setting and see the faulty result.**

Wrong way – default offset values



Right way – “0” offset values



After this second round of settings turn back to the Model Space and start the function by typing MVL in the command line or by selecting MVL in the menu (if you inserted the MVL.cui file).

Now you will be asked to “Place plan (lower left corner)” so click on the drawing space about where you want the lower left corner of the plan to be.

Now a rectangle representing the drawing area of the plan will be placed on screen. It’s scaled and dimensioned as you set it in the settings menu of the utility so what you see is what you get!

And finally this is the thing I was after when I created the utility!

All the action takes place in the Model Space and you don’t have to switch back and forth between Model and Layout or zoom out and in and do all the panning and aligning inside the viewport to make sure you capture all the content you want! You actually “float the viewport window” over the content in Model Space.

Now you have four options:

- Rotate (enter “r” in the command line) – to rotate the window;

The base point of rotation will always be the lower left corner and the vector is the bottom side of the rectangle window so you always know how the content is aligned in the viewport.

- Move (enter “m” in the command line) – to move the window;
- REgen (enter “re” in the command line) – to regenerate the model space if you need to;
- Done (enter “d” in the command line) – to finish the positioning stage.

During the rotation and moving you can use snaps to get a better positioning.

At this point you will be asked to type the name of the layout. After this input the layout and all its contents are created automatically and you are returned to the Model Space.

To check the results switch to the newly created layout “plan01”..

The function creates two layers:

- _cBorders – stores the rectangles associated with each layout created so you can get a good idea how different plans are overlapping; after the function ends, this layer is turned off and it’s turned back on when you call the function again
- _cViewports – stores the contents in the layout – borders, viewport and title block if inserted.

Now go back to the Model Space and call the function MVL again to create another layout. The _cBorders layer is turned on now so you can see how the next plan is going to be placed in relation to the other existing one(s).

Note: If the drawing gets to crowded with the border rectangles you can move them to another layer and bring them up only when you need them again.

Follow the previous steps and create layout “plan02”

The next layout is always a copy of the “Current Layout” – the last layer that was viewed. So before you start the function be careful to select the right layout because the new one will inherit it’s properties and will also be positioned before or after it depending on it’s name .

This gives you some good options:

- if you create the plans one after another like : plan01, plan02, plan03...etc. they will arrange nicelyunless you screw up ones name like 4plan or something;
- another advantage is that it allows you to insert a new layout between two old ones by selecting a neighboring layout before you call the function so that it’s created in relation to this one :ex. if you select plan02 and create a new layout named plan02a it will be placed after plan02. After that you can select plan03 and continue creating plan04, plan05 ...etc.
- you can use multiple “seedplans” just select the layout you want to get properties from and the newly created layouts will inherit them. Of course this is only about layout properties and you must modify yourself the MVL settings before that.

Known issues and limitations

- The MVL function only works in Model Space! Running it in a layout will result in an error.
- The MVL function only works in WCS ! If you are using an UCS the function will set it to WCS in the beginning. But don’t worry! In the end the coordinate system is set back to your UCS.
- Do not freeze the _cBorders and _cViewports layers created by the MVL function – crashes the program.
- Naming a new layout the same way as an existing layout will result in the latter being replaced.
- When adjusting the position of the rectangle, if you start a rotation or move command and you change your mind, just finish that command and readjust. Pressing “escape” will exit the whole function not just the rotate or move command!
- Some other stuff I don’t know about and I might find out in further development of the function. Feedback from any user will be more than appreciated!

New stuff in the future (I hope I have the time and skills to do all this stuff)

- Support for 3D UCS. Now it only works with an UCS that has the “X” and “Y” axis realigned but keeps the direction of the “Z” axis as in WCS.
- Option to save and load the MVL settings.
- Multiple block insertion
- Function to add new viewports in existing layouts
- Some “chain” function that automatically creates plans along a polyline (ex: road centerline)
- Other stuff that might cross my mind or yours!

The utility is free of charge! Because the program is licensed free of charge, there is no warranty for the program so I shall not be held responsible for any damage inflicted by it!

Contact:

- email – cr_raul@yahoo.com
- The CadTools forum (many thanks to Mr. Lars Glamsen for the support)