

Strings to Stripes

(De Traits à Bandes)

version BETA 0.5

A MapBasic® application (version 6.5)

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Overview

This application converts lines/polylines contained in a table open or not into rectangles or stripes of a constant or column-defined width. It converts also 'continuous' segments of constant or varying width into a single object (a stripe)

Continuous segments could be transformed into a one-section polyline (no gaps between consecutive segments) but are different from such a polyline because each segment can hold its own data, allowing for varying width.

When converting polylines, the gaps of the outside of "bends" between adjacent 'rectangles' can be closed by a segment (blunt corners), by an arc of radius equal to one half of the set width (rounded corners), or by the intersection of the extended "out-sides" (sharp corners).

Results can replace the corresponding objects in the original tables (lines/polylines only) or be saved to a new table (with any coordsys)

The distance unit to use for width is chosen by user.

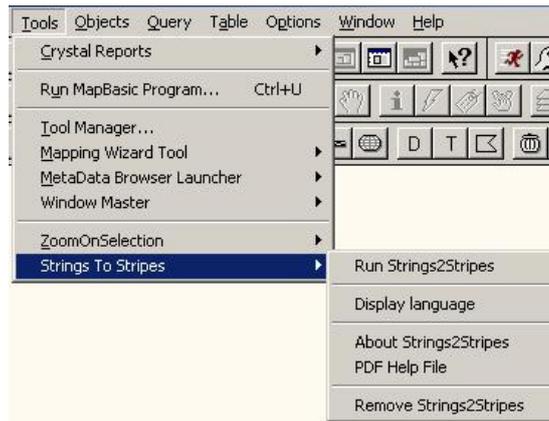
The original table must be in a METRIC projection

Installation

1 – Place Strings2Stripes.MBX and Strings2Stripes.INI in the same directory.

If the INI file is not placed with the MBX, a new INI file will be generated but in English only.

2 – Launch the MBX. The application will be installed in the TOOLS menu (or its regional equivalent)



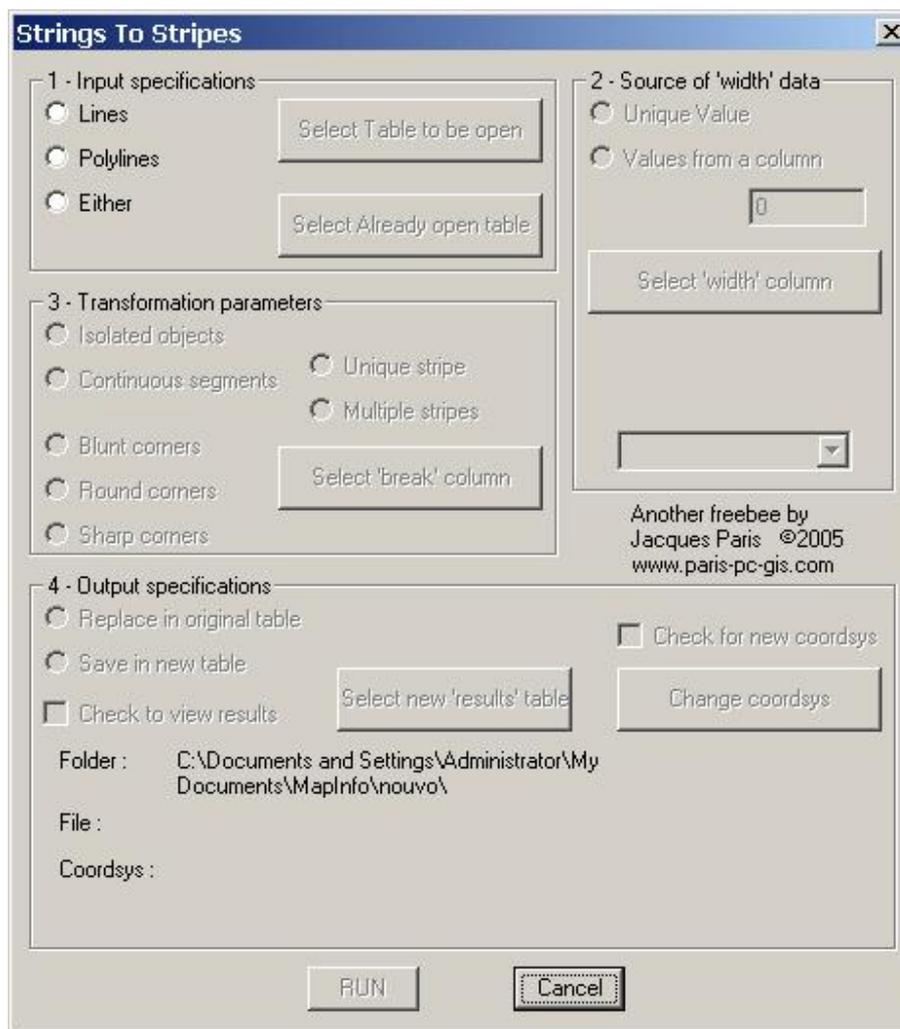
If the application is not in the appropriate language, use the second item of its menu to change it.



There is no need to explain the “About...” and “Remove...” items.

The item “PDF Help File” launches automatically the “Strings2Stripes_en.PDF” file. For that operation to be successful, this file must be placed in the same directory as the MBX application and a PDF Reader must be available on the installation.

Everything else is controlled via a dialog opened by “Run...”



Note that “Cancel” is always available to interrupt the operations (and close the dialog)

OPERATIONS

NOTE that

the user must enter information or make his choices in a specific order that depend largely on previous choices. Consequently, the dialog various components are activated as the definition procedure progresses and are de-activated if they represent choices having some consequence on the rest of the procedure. Few “un-consequential” components remain active after they are defined a first time and can be modified until RUN time.

Style of created polygons

The polygons are created using the current region style. Before starting the definition procedure, verify the current style and modify it if necessary.

1 – 1



The lines or the polylines or the lines and the polylines existing in the table that will be chosen will be processed.

In the case of “continuous segments”, choose only “lines”

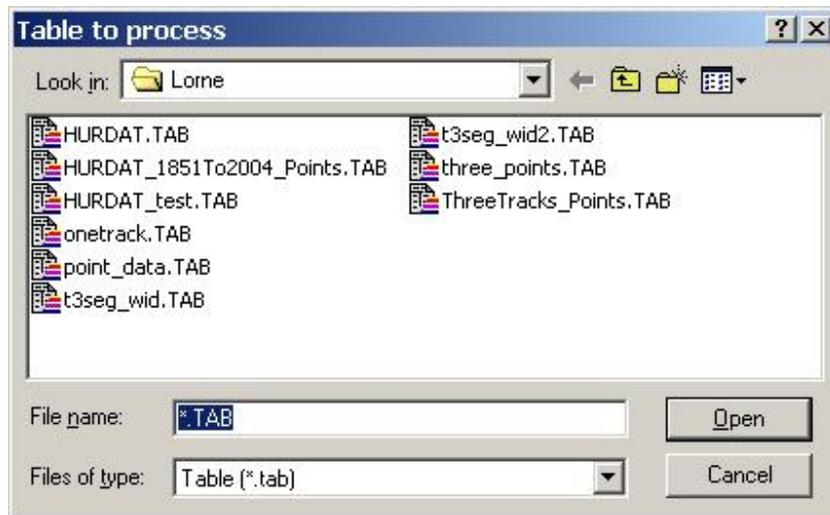
1 – 2



1 – 3

Use one of the buttons

1 – 4 a if « table to open »



« Cancel » closes the dialog and interrupts the procedure.

The table selected from the list is checked for its projection and if is a non-metric one the procedure halts



If the chosen table does not contain the specified type(s) of objects, the procedure is stopped and it must be started again. The « LINES » of the example can as well be « POLYLINES » or « No LINES, No POLYLINES » according to the choice in 1 – 1.



1 – 4 b if « already open table »



« Cancel » closes the dialog and interrupts the procedure

If only one table among those open is 'mappable' and contains the specified type(s) of objects, the following window is displayed instead of the previous one



If no open table fulfills the conditions, the procedure should be restarted from the top.



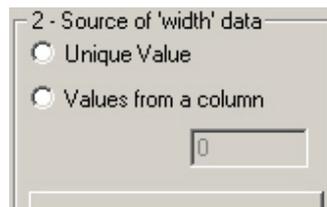
The table selected from the list or the only offered is checked for its projection and if is a non-metric one the procedure halts



As soon as a table is chosen, some general parameters (path, file name and coordsys) are displayed in the section « 4 – Output specifications ». These parameters remain the default values as long as they are not modified in this section 4.

```
Folder : C:\Documents and Settings\Administrator\My
        Documents\MapInfo\Lorne\
File : t3seg_wid
Coordsys : CoordSys Earth Projection 4, 62, "m", 0, 90, 90 Bounds
           (-9020145.99449, -9020145.99449) (9020145.99449,
           9020145.99449)
```

2 – 1

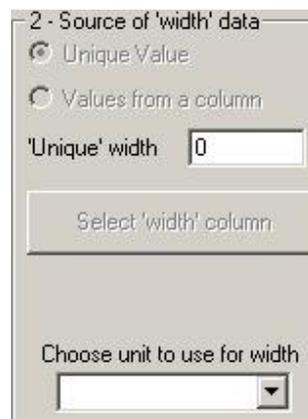


2 – 2 a « Unique Value »

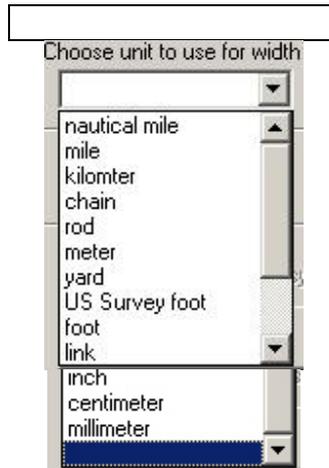
Enter

- the unique value (applies to all the objects in the selection)
- the distance unit to use with width

Width and Unit remain available till the end of the definitions

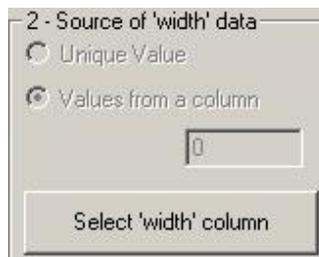


Distance units are those offered by MapInfo. Width as given is converted in meters to build rectangles and stripes.



2 – 2 b « Value from column »

Clicking on button opens the window next



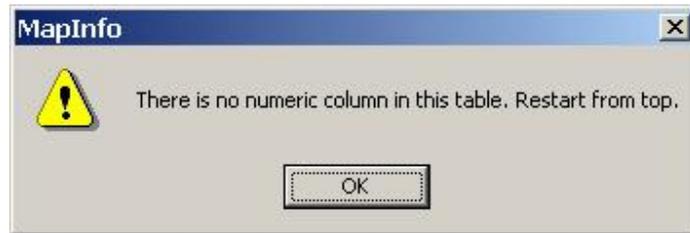
Only numeric columns are offered as possible choice (float, fixed decimal, integer or smallint)



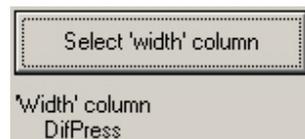
If the table does not contain any numeric column, one must restart the procedure.

See message below

« Cancel » closes the dialog and interrupts the procedure



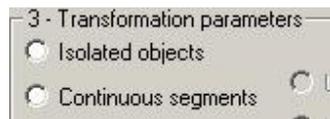
Once a column is chosen, its name is displayed:



For the choice of distance, see above **2 – 2 a**

« Width column » and Unit remain available till the end of the definitions

3 – 1



Choose a process

a –where each object is treated independently

b –where objects (only lines = segments) are considered as linked one to the other

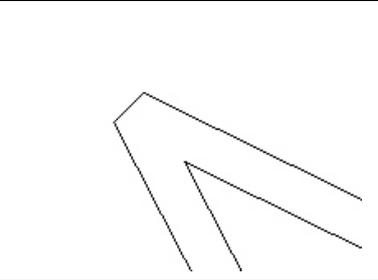
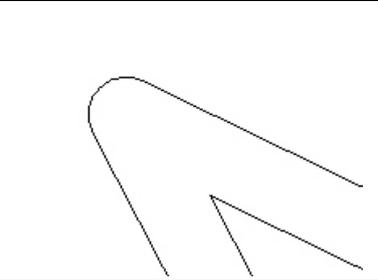
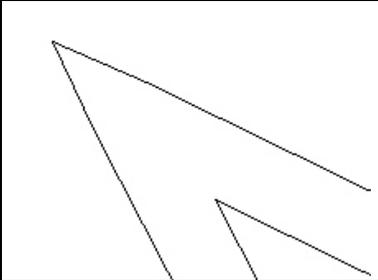
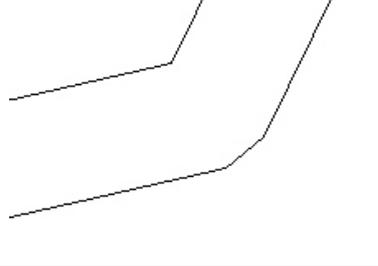
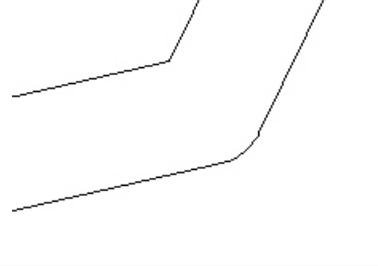
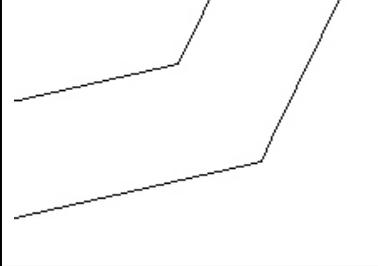
If options « Lines » and « Continuous segments » are chosen >>> **4 – 1 a**

Other options >>> **3 – 2 a**

3 – 2 a « Polylines » ou « Either » + « Isolated objects »



This parameter is used only for polylines. For them, successive rectangles (all of the same width) that are build on the segments de la polyline leave « empty triangles » in the external half of the bends (see « Displayed results » below). Those holes can be filled in different ways that give different looks:

Blunt corner	Rounded corner	Sharp corner
		
		

3 – 2 b « Continuous segments »

Unique stripe
 Multiple stripes

The records in the table may form a single ensemble (unique stripe) or several ensembles (multiple stripes). In the second case, the table must contain a column to identify those various ensembles; as the records must always be in the logical order of succession, any change of value in this column called « break column » will signal the beginning of a new ensemble.

This application compares the contents transformed into chains of characters; if this solution is perhaps longer, it relaxes any constraint on the type of contents in the break column.

Only the tabular values of the first segment of a stripe are stored in the results.

Unique stripe >>> **4 – 1 a**

Multiple stripes >>> **3 – 3**

3 – 3 (Multiple stripes only)

Clicking on the button opens the following window

Multiple stripes

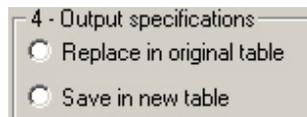
All the columns are offered as possible choice (comparisons made on character chains of the contents)



« Cancel » closes the dialog and interrupts the procedure

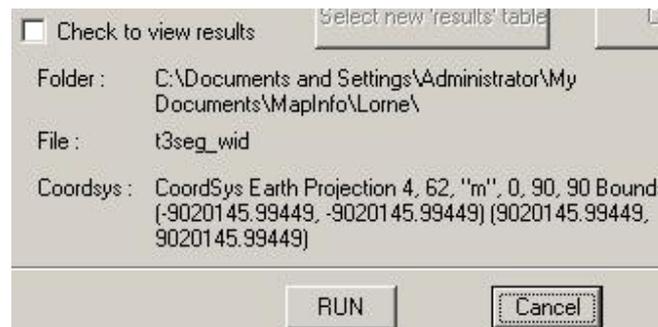
Go next to **4 – 1 a2**

4 – 1 a



Replace in original table >>> **4 – 1 a1** New table >>> **4 – 1 a2**

4 – 1 a1



CHECK to display results (original table with new objects), RUN calculations and production or CANCEL procedure

Display of results check box remains accessible till the end of definitions

4 – 1 a2



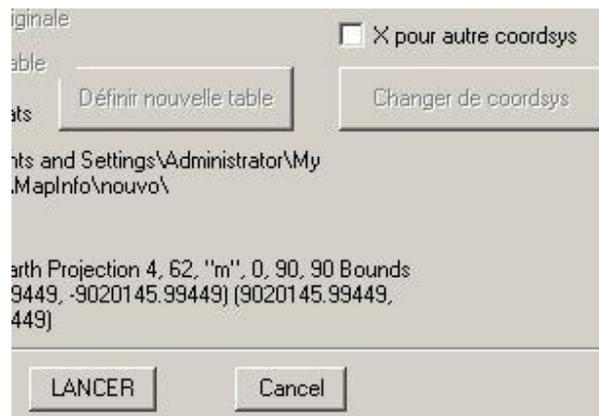
Display of results check box remains accessible till the end of definitions

Check to display results (original lines table above new stripes table). A (path +) name must be supplied for the new table.



« Cancel » closes the dialog and interrupts the procedure

The possibility to define a new coordsys is offered (see below 4 - 2). RUN is activated and production can start.

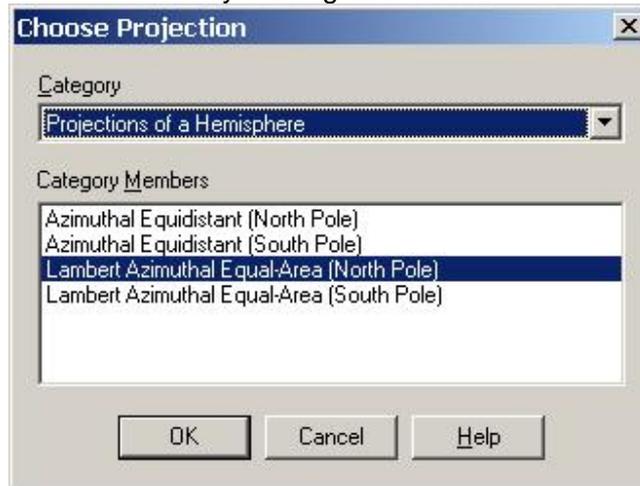


« Cancel » closes the dialog and interrupts the procedure

4 – 2



and by clicking on the button

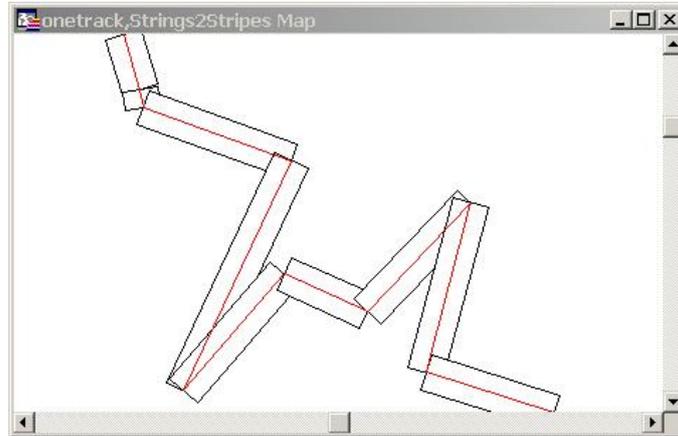


« Cancel has no influence here on the procedure

Once the choice is checked, the button to redefine the coordsys remains available till the end of the definitions.

Displayed results

The original lines table (here « onetrack », red lines) is displayed above the new « stripes » table that is always called « Strings2Stripes » for display reasons only (the user can close it without having to save it).



The « continuous segments » of this sample table are treated as « isolated objects » to show the empty triangles that would exist at the bends if the segments were combined in a polyline and no filling technique had been incorporated in the code (see above **3 -2 a**)

COMMENTARIES, PERSPECTIVES

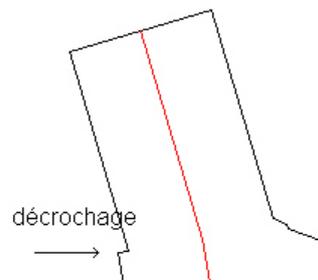
Several areas need refining; some functions might be added. Right now there are several perspectives on potential uses that are worth exploring

This chapter is the best way for users to express critiques and wishes (the only way to make the application progress) and to document domains of application. Alone, I cannot generate a range of situations varied enough to test this tool under the most diverse conditions

What remains to be done

1 – « Décrochages »

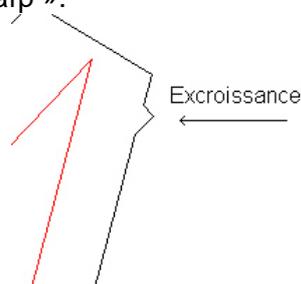
While creating stripes, some « décrochages » may appear if two successive segments have different widths (see example below)



A possible solution would be to extend the « wider » side to its intersection with the « narrow » side, assuming their intersection remains in allowable limits.

2 – « Excroissances »

« Excroissances » can happen when two successive segments have different widths and the angle they form is « sharp ».



The program should have eliminated all of them but some still remain. To be fixed.

What could be added

1 – Polygon style

Unique style:

A style-picker control could be added to the main dialog; it would allow changing style during the definition procedure. Forgetting to change style before opening that dialog would not be a penalty anymore.

Variable style:

The border style of a stripe could be that of the segment/polyline on which it is built. It would be more difficult to handle fill styles automatically; there could be a global choice between transparent (no fill) or opaque and for opaque a colour choice similar to that of the border line.

2 – Pointed corners

It should be possible to limit the size of the points at very « pointed » bends by chopping them off with a circle of a given radius (expressed as a proportion of the width as for example *1, *1.5, *2 *,,,)

3 – Corners of varying width stripes

If stripes built on polylines can offer three types of « corners », those built on continuous segments have only blunt corners. It would be difficult to use simple arcs because there could be different radii as widths of successive segments would most generally be different,

However, adding the option “sharp corners” within the size limitation discussed above could be considered.

4 –Graphic scale

The interpretation of the results would be greatly facilitated particularly in the case of non-metric variables if a graphic scale could be added to the stripes maps.

Perspectives on applications

1 – The Scale Question

In some applications, the objects to be built have real physical dimensions that can be expressed with the same unit as that of the coordinate system (essentially in meters); these objects can be scaled directly (width in meters and meter as unit). But in other applications the variable is not metric and the contents of the column (traffic counts, noise levels, wind speed ..) must be converted to some real physical metric measures to get objects that make sense on the map. There are two ways to proceed if the use of meter as distance unit does not give satisfactory results:

A – transforming tabular data by adding a « to be mapped » column updated by some scaling factor applied to the original data. This requires a modification to the structure of the table at least once and possibly several updates for adjusting the scale factor, a relatively slow and haphazard procedure.

B – using the available units to adjust the ratio « read values » / « metric map values ». As meter is the reference in this application, the method allows for variations between 1/1000 (millimeter) et 1853.2 (nautical mile) but the ratios are not evenly.

Unit	Scale factor
nautical mile	1853.2
mile	1609.35
kilometer	1000
chain	10.08
rod	5.02
meter	1
yard	.9144
US Survey foot	0.3048006
foot	0.3048
link	.2011
inch	0.0254
centimeter	.01
millimeter	.001

It could be possible to ask the user to enter a specific scale factor. That could become an item in the « What could be added » list.

2 – « Squared-end buffers »

Processing « isolated objects » produces rectangles or stripes corresponding perfectly to the notion of « squared-end buffers » under the condition that the option « rounded corners » be chosen. Discounting the flat ends flush with the extreme end points, the rest of the object is identical to a buffer produced by MapInfo.

Processing « continuous segments » allows besides to build a single object of varying where MapInfo would build separate objects of different widths with possible overlays

(combining them will eliminate those overlays) but also gaps that cannot be filled but manually.

Estimate of built-up surface

The BDTQ (Banque de données topographiques du Québec) offers several layers and in particular one for buildings that are represented in 3 different ways : some main buildings are shown as polygons, some more « linear » as lines=segments or polylines, et a majority of residential buildings as simple points.

The projet that interest us should produce an estimate of the built-up surface in a given area (Francis Falardeau, Chargé de projet SIADL, Agence de bassin versant de la rivière du Nord (*Abrinord*) siadl@abrinord.qc.ca)

Le surface of the main buildings can be easily calculated as long as the polygons are true « regions » and have the correct.

For the « points », the project used the Pnt2Rect.MBX application (offered par Jacques Paris) that transforms points into rectangles. It requires that the points table contain in 3 columns some specific information: one for the rectangle length measured along the main axis, one for the width measured perpendicular to the main axis, et one for the heading of the main axis. The user specifies which column to use for which information.

Only one value for width and one for length were used for this project. 8m x 12m seems to be an acceptable average. The orientation of the buildings was taken directly from the BDTQ database.

The width of the linear buildings was estimated to 8 meters; this value was judged acceptable for the study area. One should know there were about 600 of these buildings and resources were limited. The Strings2Stripes application was used with the option “sharp corners” giving the results the closest to reality.

The following illustration gives an idea of the synthesis of the three “rebuilding” operations over the background of the corresponding orthophoto::

In purple : main buildings defined as polygons

In cyan : “housing” units defined by their centroids (red dots)

In red : linear buildings defined by their “center” lines-polylines (in yellow)



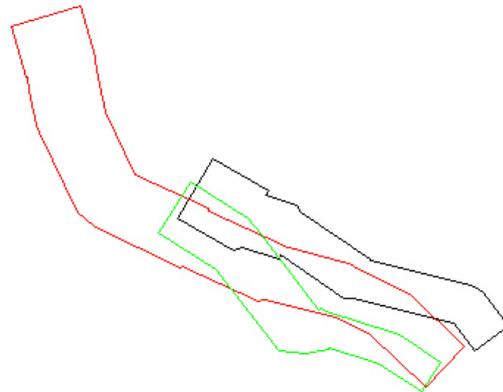
Storm tracks

The idea is to represent the evolution of some measure of the force of a storm along its track. Available data is generally under the form of punctual measures taken at regular time intervals, Some pre-treatment is normally required to convert these chains of points into continuous segments. Lorne Ketch LKetch@hfx.eastlink.ca, a recent retiree from the Meteorological Service of Canada, has conceived TrackLines.MBX for this purpose.

The variable that is displayed is a measure of the atmospheric pressure (observed pressure minus 900) to make variations more visible. Stripes style was adapted to make reading easier. Original data for the 3 storms are real but the multiple transformations I have applied to them make a return to reality impossible.



Traces of 3 storms produced by
TrackLines.MBX



Variations of atmospheric pressure along
the traces of 3 storms

