CAPLAN Version 3.2

October 2011

The recent INTERGEO trade fair in Nuremberg, Germany, demonstrated to us that CAPLAN continues to be very popular. And during the last six months we have been able to implement many of the suggestions submitted by users in order to enhance the program.

Transformations, in particular the move to ETRS89, will remain an important issue in Germany over the coming years. The federal states in Germany are converting their coordinate systems one after another, with some of them providing grid files for the NTv2 transformation method for the conversion process. In addition the states of Hesse and Thuringia, the state of Saxony has made the NTv2 SaeTA2010.gsa file for the conversion from RD/83 to ETRS89 available at http://www.landesvermessung.sachsen.de/inhalt/etrs/etrs.html. Once this file has been downloaded to the DAT folder associated with your CAPLAN installation, you can carry out coordinate transformations in Saxony with an accuracy of a few centimeters.

It is becoming increasingly common for CAD datasets stored in the DXF format to be transformed. Such transformations are difficult in particular with regard to arcs, as these are defined in DXF using the mid-point, the radius and the directions to the two endpoints. For an exact transformation, three points on an arc are calculated and these are then transformed. A new arc is then created from these three transformed points, reflecting the distortion caused by the projection.

Any images contained in DXF files are now also adapted in terms of size on the basis of the transformation's scale.

The viewport in paper space is also transformed, so that the transformed model data can be displayed there. It should be noted in this context that previously existing coordinate labels and grid crosses become invalid following the transformation.

Flat Earth

The projection is now also available in the program. This is used, for example, when 3D scenes involving the earth's surface are created using simulators. Although the Flat Earth projection is not conformal in nature and is therefore of relatively little interest in surveying terms, it is included in CAPLAN in order to make conversions between national coordinate systems (e.g. UTM coordinates in the ETRS89 system) and simulator coordinates possible.

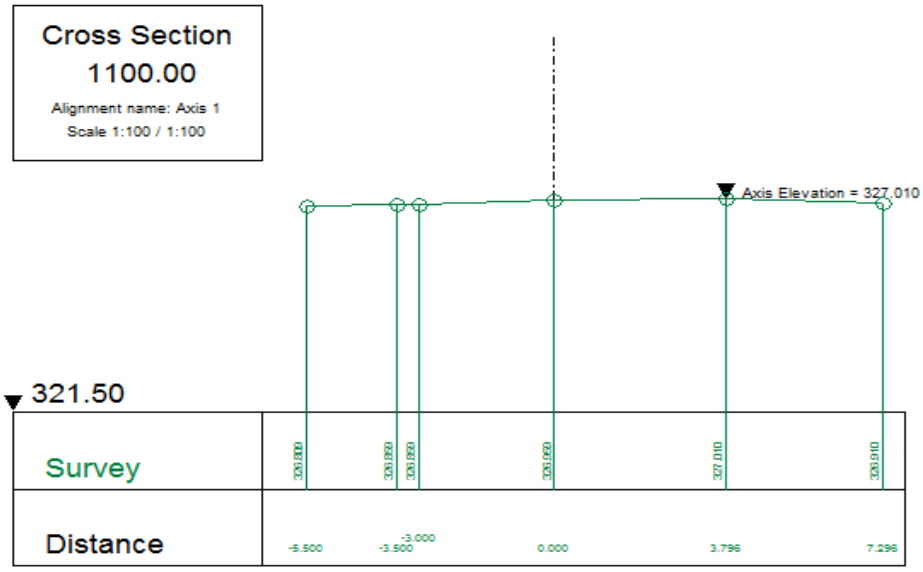
alignment

vertical curve

As soon as a road surface referenced to an is defined, the vertical curve can also be associated with a lane of the road surface lying parallel to the alignment. This is common practice when working, for example, with freeways, with the actual alignment running along the central reservation but the being referenced to the center of a traffic lane. The lateral distance (offset) to the vertical curve is taken into account in all calculations relating to the road surface, such as:

- Setting out an entire road surface
- Setting out a single lane of a road surface
- Checking a road surface
- Interpolating point elevations from the road surface
- Creating profiles from a road surface

In cross sections, the vertical curve is also portrayed laterally to the alignment.



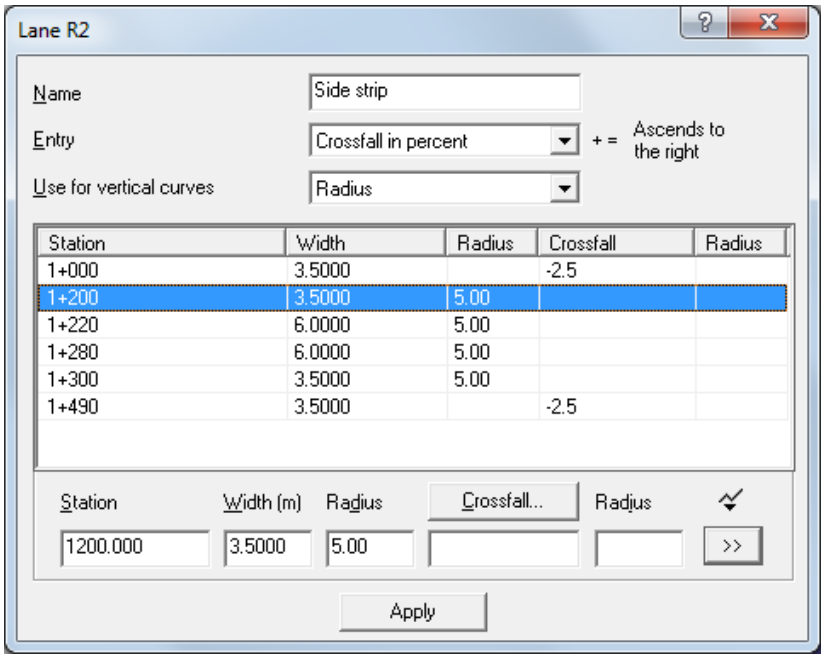
VESTRA

A new interface for the S40 data format from has been added as an option when loading alignments, as our users quite often receive such files from planners.

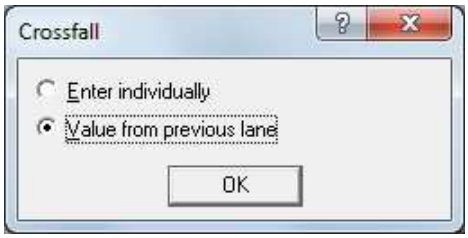
GND-Edit

The Deutsche Bahn AG's track network database can contain data based on various coordinate systems in a single database. The import dialog for alignments (and also the import dialog for points) now allows specification of the plan and vertical reference systems in use.

road surface The functionality has been revised and now provides rounding curves for width and crossfall change locations, with these then being taken into account in all road surface related tasks.



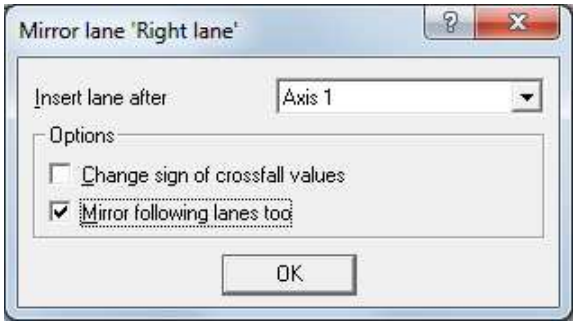
extension When entering details for a single lane, the crossfall can be defined as an of the previous lane by using the button marked 



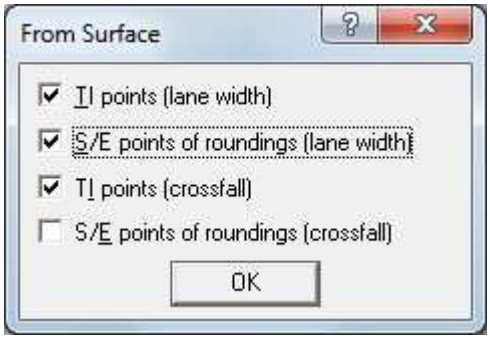
A polyline can be used as a template for a lane. The “Get Line” button can be used to calculate the station, lane width and crossfall at each vertex of the selected polyline and to enter these values in the list. Already existing data is not affected.

If the road surface configuration is symmetrical around the alignment, it is sufficient to enter details for the lanes on one side of the alignment, and one or more of these can then be

mirrored to the other side of the alignment.



The “From Surface“ option in the station dialog is able to differentiate between TI points and the starting/ending points of roundings.



When drawing a vertical curve it is now also possible to portray a width band in addition to the crossfall band. In this context, it is possible to select which lanes of the road surface are to be used in the display.

There have also been a number of enhancements made in the Project Window with regard to

points and lines.

The ordering of point names in the point list is an important aid for users. The sorting algorithm for point names in the point list always first shows the purely numerical names at the top of the list. The alphanumeric point names are then listed, having being compared with each other character by character in order to establish the order. Since summer 2010, the point names are always left aligned in such comparisons, although this can lead to an unintended sort order for the points. It is therefore now possible, via “Settings / General“ and the “Names“ tab, to specify whether or not to use (turn on/off) such left alignment or whether right alignment should be used instead.

Example:

left aligned	right aligned
PN1	PN1
PN11	PN2
PN12	PN3
PN2	PN11
PN3	PN12

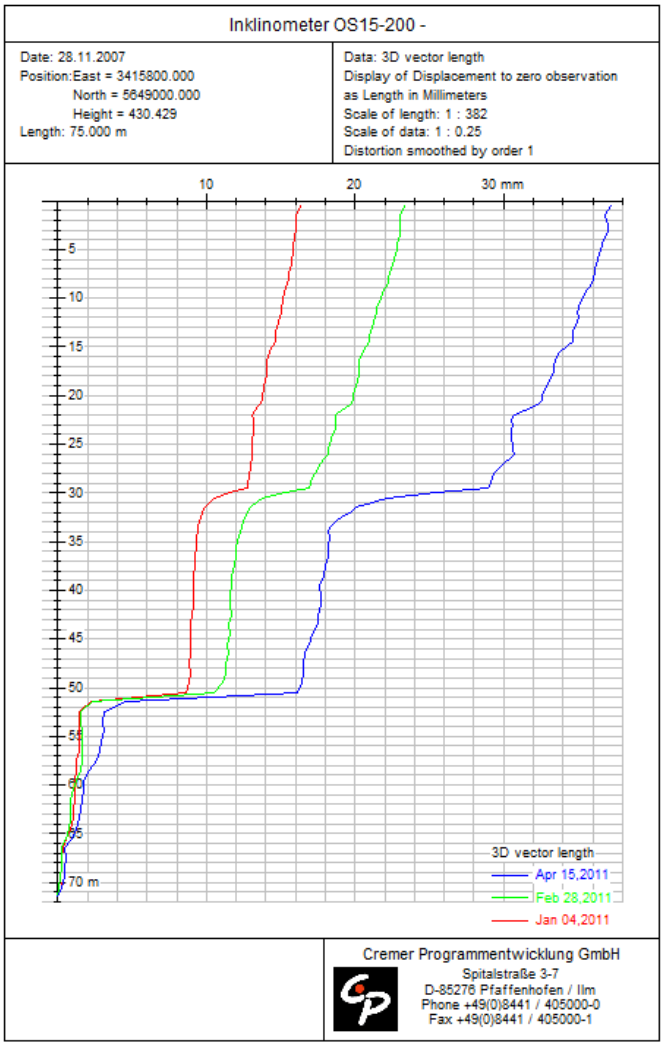
When saving points in the tacheometry formats defined by Geodimeter, Leica, Sokkia, Topcon, Trimble and Zeiss, a check is carried out requiring the uniqueness of point names in the project, as this is a pre-requisite for surveying and setting out with total stations.

When loading circles from DXF files, the center point will now always be imported and created in CAPLAN. And when importing lines, the actual circle will also be created as a polyline. Reference to the actual center point is therefore always ensured (useful for example when working with drilled piles).

When carrying out a point export to the DXF format it is now also possible to generate the DXF 2004 format. This allows long block and layer names to be retained. All points in the DXF file can be set to Z=0.0.

The line dialog features a new button  , which can be used to specify whether points clicked in the list are to be included in the screen display area if they are not currently visible. This makes it possible to avoid the on-screen display being inadvertently changed when editing a line.
The addition of vertices to polylines in the Project or Plan Window could previously result in collisions with roundings if a new vertex was located close to an existing line segment. In the Project Window, a point now always takes precedence over rounding.

Until now, **pipe shifts** measured using inclinometer or inkrex observation data were displayed in sections in combination with terrain data. The new function "Plan / Diagrams / Single Pipe Displacements" can be used to create A4 plans for each individual pipe. These can include the observation data as well as the differences between epochs. This epoch comparison also permits the display of velocities and distortion rates. The frame template PIPE.FRM can be used for such plans and is installed from the setup CD.



observed data

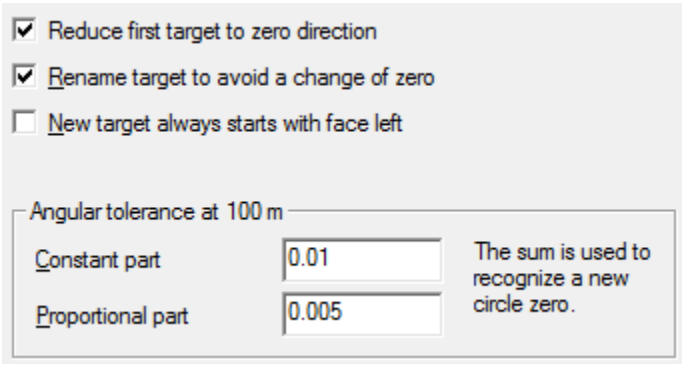
The functions for importing and evaluating require regular adaptation in order to meet current requirements. For example, when importing

tacheometry

observations via the "Directions" dialog page, the new "Rename target to avoid a change of zero" option is now available. Activating this option results in the

horizontal circle

not being moved when various target points have the same name. Instead, a question mark is added to the second target point name in order to avoid a circle rotation (change of zero).



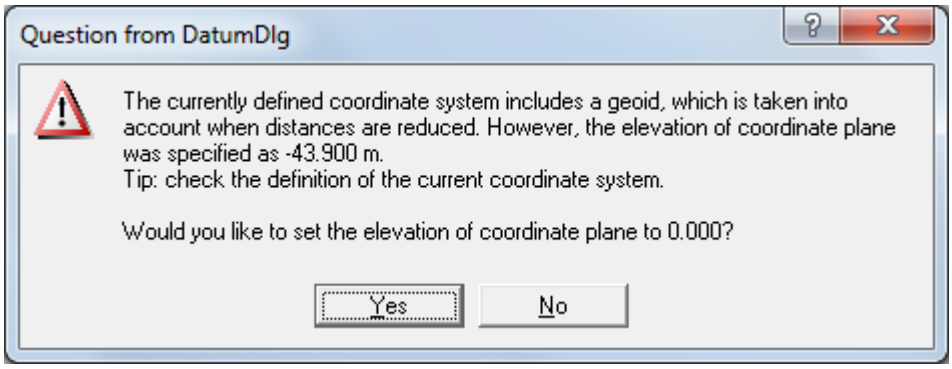
The directional tolerance for a circle rotation was previously defined by the addition of both input values and was specified as being fixed. Now though, the proportional (distance dependent) part is determined correctly in accordance with the actual distance to the target point.

reduction

The reduction of horizontal distances to the coordinate plane involves an adjustment being carried out involving a projection part and a part that takes the elevation into account. As elevation values are referenced to the geoid, but the coordinate plane is the ellipsoid, elevation values must be corrected, in particular if the geoid – ellipsoid separation is considerable in terms of height. Such corrections were previously carried out exclusively using the coordinate plane elevation value (H0). However, the

Geoid

is now also taken into account for such distance reductions: if a geoid is defined, this is now used for the height reduction, and H0 must usually be set to 0 in such cases.

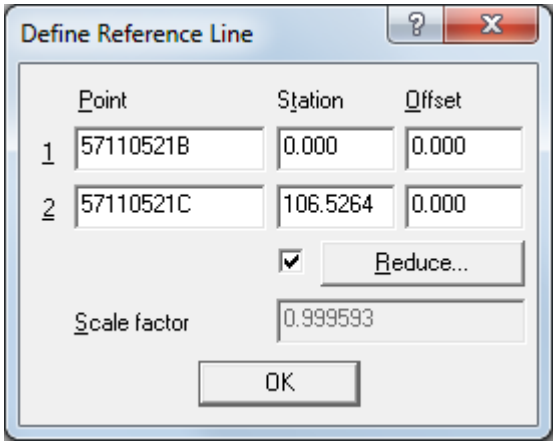


calculations

Such distance reductions are also taken into account in many carried out in CAPLAN.

reference line,

When defining a the scale factor was previously calculated as a ratio of the total measured line length compared to the line length calculated from the coordinates. The factor used for distance reductions can now also be used as the scale factor.

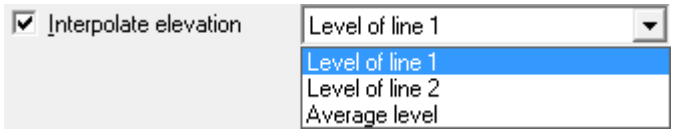


line

A (e.g. for creating an intersection with two lines) can be defined in a project using a starting point and a bearing. The bearing can now be specified by clicking a point in the detail window

intersection points

Several tasks in projects lead to the definition of (e.g. Extend Line, Trim Line, Line Intersection). The elevation of the intersection points can now be taken from either the first or from the second polyline. The average value of both elevations can also be used.



networks

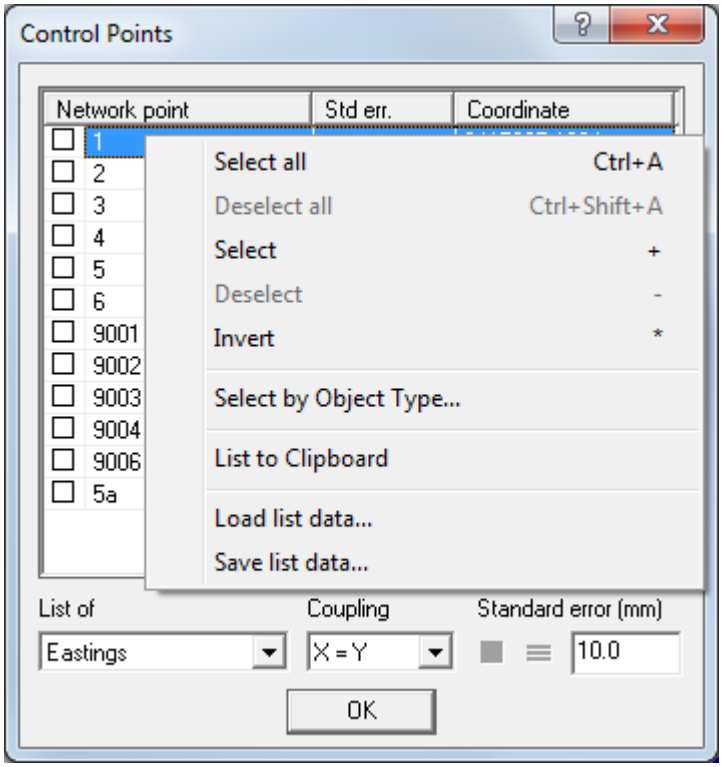
For large that are calculated repeatedly, it is time consuming to reselect the reference points every time the network is regenerated. The list of selected

reference points

can now be saved in a file via the context menu, and reloaded later on from the file. This can also be done for the list of selected points for deformation analyses. In the dialog used for editing the fixed reference points, the loading and saving operations apply to the current list view.

The dialog for editing network reference points now includes the option to carry out a selection based on the

object type, via the point list's context menu, as is already the case when creating a network.



The

plan creation functionality provides a wide range of options for designing and structuring plans.

Alignments are now adorned with regular station labels at rounded station positions.

The

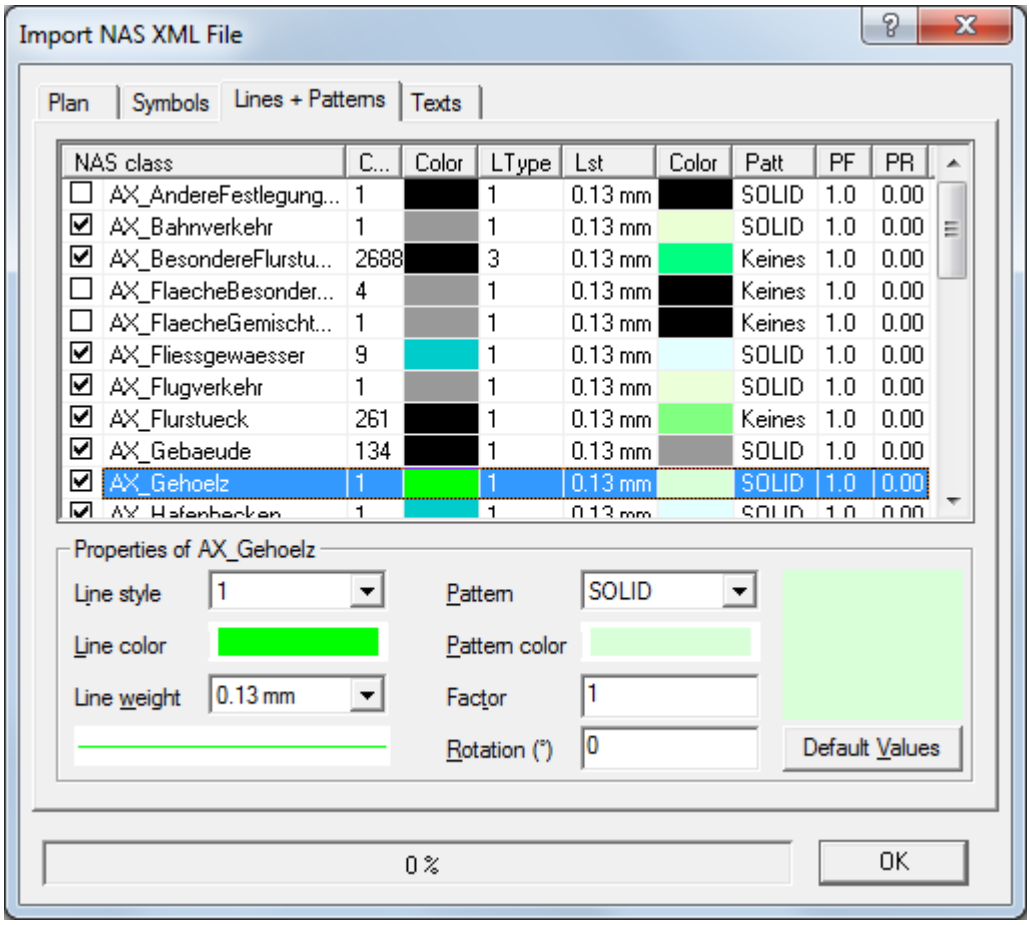
gradient

indicators in plans can now be displayed with a variable offset from the alignment. If the offset distance is 0.0, the gradient indicator is located directly on the alignment.

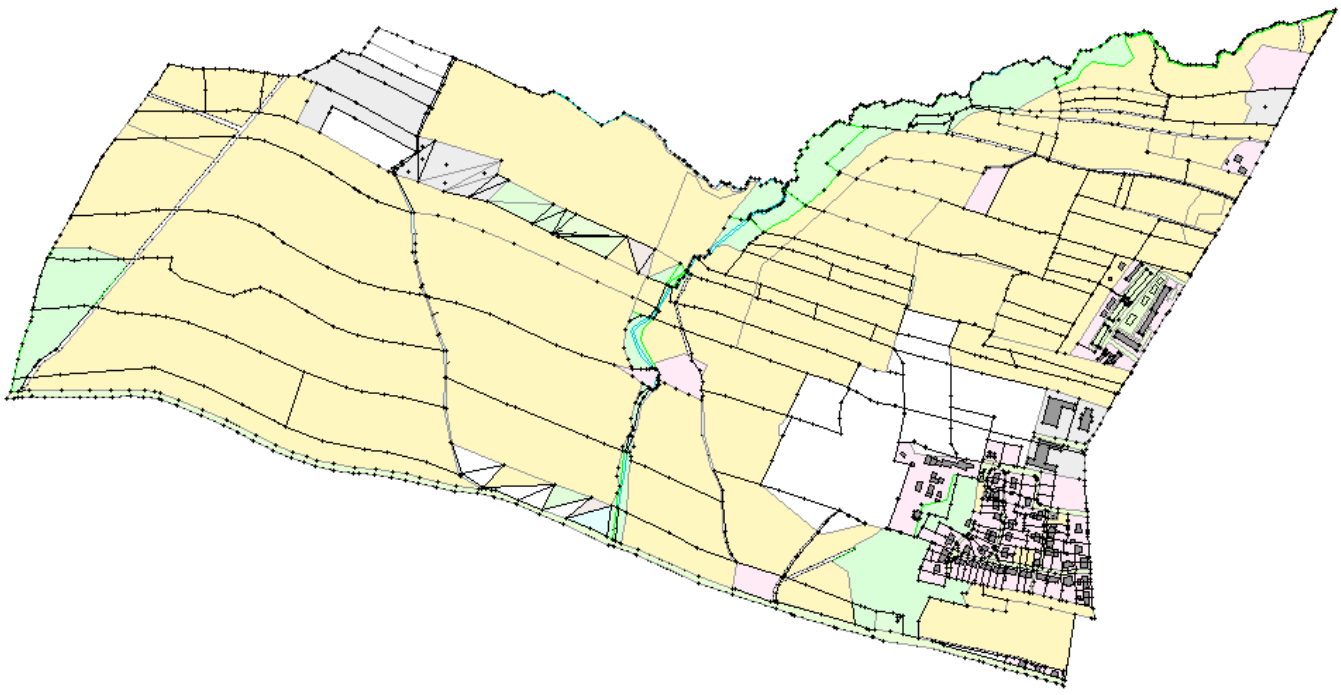
A number of new features and enhancements are of course also available in the

Plan Window. In Germany, an increasing number of federal states are converting their cadastral data to ALKIS. The importing of NAS data into CAPLAN for carrying out ALKIS data calculations was already available in the program. However, a complete cadastre plan is also required as the basis in many projects. To cater for such a need, ALKIS data in

NAS format can now be imported in its entirety, with a complete display of plan data available in the Plan Window. When loading plans, the file type "NAS-XML (ALKIS) (*.XML)" is thus also available. The required configuration files (NAS*.DAT), which contain the applicable default values, are automatically copied to the Cremer's installation DAT folder during the program setup.

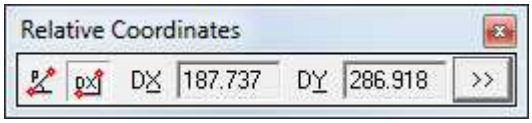


The following example of ALKIS data imported from the NAS format shows the data displayed in its entirety.

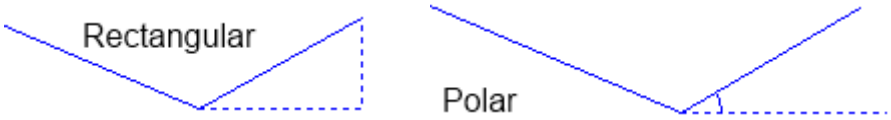


polylines

When constructing and drawing and areas, it is sometimes necessary to be able to create rectangular objects, such as for building outlines, using pre-specified dimensions. This is facilitated by the “Relative Coordinates” function available in the polyline dialog.



This allows rectangular or polar coordinates to be specified by clicking in the detail window or by entering the values in the dialog.



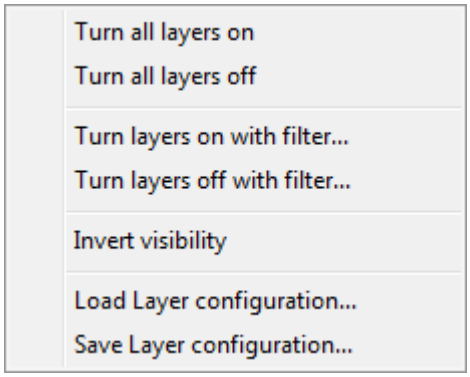
It is possible to toggle between making entries in the detail window or in the dialog fields by simply clicking with the mouse. A number of points can be entered one after another without having to exit the dialog each time.

If freely defined vertex points are specified by clicking when constructing polylines and areas, these have no elevation. The elevation of these points can be calculated or set at any time using the coordinate list’s context menu. The option "Interpolate empty elevations" is now available and results in all missing elevations being calculated automatically when the dialog is ended, to the extent this is possible.

The addition of vertices to polylines sometimes resulted in collisions with curves, if a new vertex was located very close to the existing line segment. Such points now take precedence over curved segments if the point snap mode is activated.

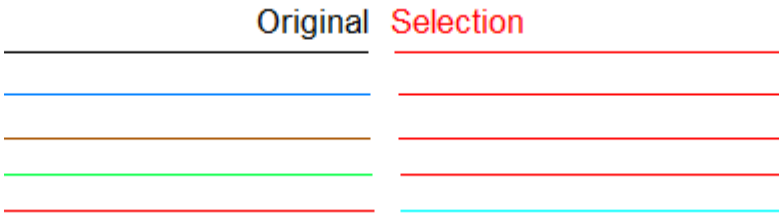
Layer Controller

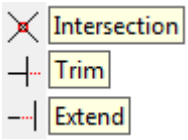
When in a closed state, the provides a context menu (accessed by the right mouse button) that allows layers to be turned on and off via a name filter with wildcard functionality, e.g. "VE*". A new feature is that the entire Layer Controller configuration (i.e. current settings) can now be saved to a file and also reloaded when required. The layer configuration includes settings such as visibility as well as other layer properties such as color, linetype etc.



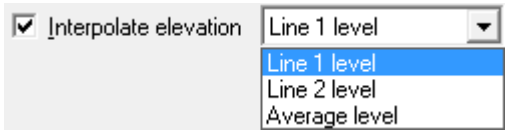
When in an open state, an entry can now be selected when you have just entered the first few characters – the most suitable entry in the list is then found and selected.

The **selection** of elements was previously quite difficult if the color of the elements was similar to the color defined as the selection color. In such cases, the complementary color is now used to represent these elements when selected (see the bottom line below).

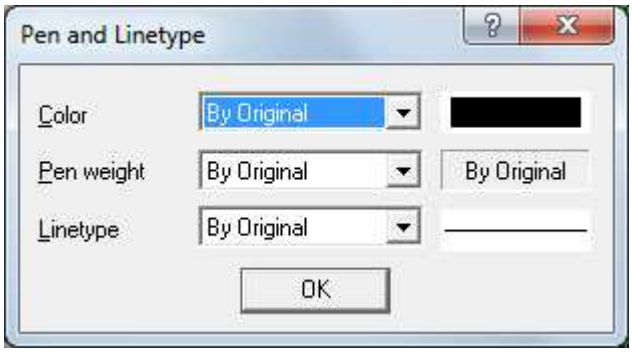




The "Line Intersection", "Trim Line" and "Extend Line" functions are now also available in the toolbox on the left hand side – via the buttons depicted on the left. This allows common design procedures to be carried out considerably quicker.
These functions calculate intersection points. The elevation of such points can now be taken from either the first or the second line involved in the operation. The average of both elevations can also be used.

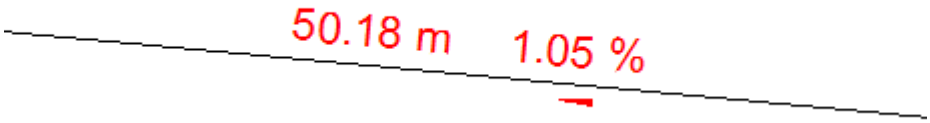


A number of functions in the Plan Window lead to the creation of **new elements** that are based on an original element (e.g. slope shading or dimension labels). In addition to the layer, it is now also possible to assign the original element's color, pen weight and linetype to the newly created element. For this, the "Pen" dialog has had the "By Original" option added.



As a result of many user requests, we have extended the options for adding **symbol attribute** labels to include eastings and northings. Coordinate labeling is thus now very flexible.

Previously, if polylines were labeled in the Plan Window with their lengths and with their gradients, the dimension texts would overlap each other as they were positioned in the same place. The "Longitudinal Offset" parameter now available in both dialogs can be used to offset such dimension texts along polyline segments, thus helping to avoid text collisions.



A further comment regarding **on-screen navigation**. Some users work primarily with the keyboard and make use of key combinations and the function keys. In order to reduce the need to switch to the mouse when working in this way, the arrow keys can now be used to pan the screen area of the detail window in all four directions.

To conclude, we can mention an aid that may be of use to network administrators in large companies. The parameters for the CAPLAN **setup** process can now be defined in an INI control file, thus avoiding the need for user input during the installation. This makes installation of the program on networks considerably more straightforward. Further details are available in the online help under "Installation - Unattended Setup".

Amongst this range of enhancements you will no doubt find a number of functions that are of use to you in your daily work. As always, we welcome your feedback and any suggestions you may have regarding improvements, as these help us to develop CAPLAN and tailor it to your specific needs.
We plan to release the **next update** in spring 2012, and this will of course feature a range of new functions and enhancements.

We wish you all the best in your work with CAPLAN and a successful end to 2011.

Pfaffenhofen, Germany, November 2011

The Cremer Programmentwicklung GmbH team