

# Change list

## City**GRID**<sup>®</sup> 2016 Release 10.00

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This document outlines the improvements and enhancements made to City**GRID**<sup>®</sup>. Items are listed by Module and referenced (where appropriate) by the issue tracking reference (otherwise known as the Team Foundation Server ID: e.g. F-425). References are used by clients to track implementation of requests submitted to UVM Systems. Further information on new and altered functionality is available in the relevant User Manual.

Following items are translated automatically, please apologize erratic spelling and unusual sentence compilation.

### Setup

#### *Recent Developments*

- FME 2016 is supported by City**GRID**<sup>®</sup>. (A-1539)
- 3D Studio Max 2017 is supported by City**GRID**<sup>®</sup>. The present version has been tested with Max 2016 (A-1595)
- The FME workspaces to create the builder raw data will be installed into City**GRID**<sup>®</sup> installation directory under "FME Plugins \ Builder". This ensures that with each setup the latest versions of these workspaces are always supplied. The files can be removed from this location or remain as a template. If the workspaces are changed, storage in a different place is recommended. (E-1388)
- FME Custom Transformer may no longer be copied to the FME installation directory. They need to be stored in corresponding FME folder (typically C: \ Users \ XXX \ Documents \ FME \ Transformers). Due to Windows security practices updating or deleting files at this location through an external program (the City**GRID**<sup>®</sup> Setup) is not allowed, so the Custom Transformer can't be installed automatically during the City**GRID**<sup>®</sup> setup. During installation all the Custom Transformer are copies into City**GRID**<sup>®</sup> installation directory under FME Plugins \ Custom Transformer. From this path they can be independently copied to the appropriate location, so that they are available in FME Workbench. (A-1520)

# CityGRID® Manager, CityGRID® Administrator

## Recent Developments

- If a process has been called several times, each thread opened its own console window and ended it again. By doing so, each console window always got focus from Windows, which made parallel work on the computer very difficult. With new version a console window will only be opened once and all processed run inside this window. Therefore focus is no longer lost at process change and the console window can be placed in the background. (E-1362)
- Elevation grids can now export to format ESRI ASCII grid. Height values can now be stored explicitly for each cell. All other export formats write grey scale of 0-255 in pixels and are therefore not suitable to map exact height values in surface models. (E-1293)
- Triangulation of roof overhang was reworked. Most essential change here is the temporary introduction of breaklines during triangulation to form correct areas at incoming breaklines from the main roof. So far unwanted triangles ("fins") emerged that could lead to implausible results of surface. Elimination of these faces caused great interactive effort. (A-467)
- Vertical surfaces in a roof overhang element will be removed during triangulation. Likewise, the corresponding vertical roofs element is eliminated too. As a consequence the formation of the roof areas has become much more realistic. (E-467)
- The automatic texturing uses a new mode to recognize contiguous areas for texturing. For areas falling into a cluster it is now already enough to share a common point, so that areas are assigned the same texture image. Therefore undesirable fragmentation of planar surfaces is prevented and the number of texture images decreases. (F-1497)
- During automatic texturing an additional image border can now be set in CityGRID® Administrator. This regulates the additional size of the cropped image in the automatic texturing. So far, a fixed value of 50 pixels was used. The new parameter specifies the border in meters and is set by default to 0.01 (1 cm). A variation of the value leads to a significant reduction in the amount of memory in texture images, but causes other hand, limiting the texture preservation, if the building size is enlarged. (E-1284)
- The export of textured building data with roof overhang on CityGML now allows the use of the option "Roof Overhangs according to German SIG3D ('AG Quality') Recommendation". Existing textures are now retained when the roof surface is separated into independent complexes. (F-1493)
- Exports over the CityGRID® Administrator can now save automatically into subdirectories. If the checkbox in the export dialog is set, CityGRID® stores each model under the specified export path to a subdirectory bearing the model name. By this measure, textured models can be exported individually with its texture images. Compared to

previous versions of City**GRID**<sup>®</sup> the union of all texture images in one "images" folder is thus avoided. (E-1359)

- When exporting models over the City**GRID**<sup>®</sup> Administrator texture images can now be prefixed. Images from different databases can therefore be clearly identified. An unintentional overwriting when importing to another database (for example, CityDB) is prevented. (E-1414)
- The export of a surface grid on the City**GRID**<sup>®</sup> Administrator will now generate a world file for each raster. The grid are therefore georeferenced and can be combined with other geospatial data. (E-1357)
- Elevation grids can be cut with a grid. If a grid is defined in Advanced dialog of the export mask the Elevation grid is split automatically to the desired size. The parts bear the name of the (terrain) model and serial numbers for the row and column number of the grid. (E-1358)
- In the automatic texturing from oblique imagery with visibility analysis Nadir images were preferred because they had a seemingly higher resolution. The reason for this lay in the use of the altitude above ground and the derived pixel size. By introducing a scaling factor of the ground pixel now oblique images are used where possible. (F-1563)
- Faces of complexes that are completely within another complex are deleted immediately. This is particularly true on detail element complexes that are completely within the main building and have the facades extrusion type "parent element with hole" not set. (E-1486)
- Units with floors that were formed not by triangulation (on an outer floor boundary) differ now if the floors were formed automatically by intersection with terrain model, or by other means. This is necessary for recognition of automatically formed floors and appropriate handling in subsequent processes. Through this conversion, a database update is necessary, as well as conversion of all older XML files. Once such an XML file is loaded in the Modeler, a prompt asks if the conversion is to be started. As usual City**GRID**<sup>®</sup> saves a backup copy of XMLs and adds the schema number to the end of the filename. The selected file itself undergoes the update and then opens in City**GRID**<sup>®</sup> a module. (F-1412)
- When exporting to CityGML all element complexes are ranked according to the sum of its upward-facing 2D surface. The complex with the greatest sum will create the Building with its associated thematic areas, any other element complexes are exported as Building Parts. (E-1452)
- In City**GRID**<sup>®</sup> Administrator is now possible to derive geometric attributes from the Unit geometry and write as an independent attribute in City**GRID**<sup>®</sup> database. As first of these geometric attributes the Unit volume has been implemented. By calling the corresponding function City**GRID**<sup>®</sup> calculates volume for each Unit and stores the value of the Unit. This creates a new version in the database. After every geometric change the geometric attributes must be made again. (E-1583)

## ***Fixed Problems***

- The working directory of visibility analysis had to be empty at the start of the calculation. Otherwise, this function fell to the exam on data actualization. Thus existing visibility maps could not be used in a re-texturing. (F-1260)
- Surfaces of the roof overhang are removed when the triangular face has segments on the inner and outer boundary polygon. (F-1146)
- Visibility maps were currently always created in LoD2, regardless of the set LOD in the Advance dialog of automatic texturing. Thus it could happen that surfaces of LoD3 elements (roof details) received no valid candidate image and remained untextured. (F-1498)
- When exporting to CityGML with option " Roof Overhangs according to German SIG3D ('AG Quality') Recommendation " textures of roof overhangs were lost. (F-1454)
- When exporting to DXF the MEASUREMENT setting was set to 0, which meant that the DXF data with inch units in CAD programs have been loaded. In consequence referencing problems could occur with data in meter units. Now both, the MEASUREMENT and the UNITS, refer to meter units. (F-1458)
- The automatic texturing now recognizes images in file system with different orientation than in the orientation values. In such a case, the affected unit is not textured and in the log file the warning is found that the texture coordinates are outside the valid range [0..1]. (F-1566)
- The converter DWG2XML examined the default parameter files (Building, building, subway, Intern, Metro) in the Custom folder of the installation folder and not in the intended Settings folder. The conversion of DWG files to XML CityGRID® therefore failed. (F-1410)
- If facades used the extrusion-type "Extrude to terrain with floor", the creation of the floor surfaces did not occur in LoD1. In addition, a Usage "\_\_autoGenerFloor\_\_" was set in rare cases. (F-1153)
- The license verification for automatic texturing will be made only at the opening of the associated window in the Administrator and not just for the start of the Administrator himself. If you have enough licenses available for the operation of several Administrative instances, so the automatic texturing can now also start if other instances of the Administrator running on other computers. (F-1364)
- When you click on "Remove" in the Advanced dialog of CityGML Export the parameter set in the associated .ini file was not completely removed. Thus integrity of the parameter file was affected. (F-1594)

# CityGRID® Modeler

## *Recent Developments*

- Revision of the texture window. This showed a suboptimal behaviour, which led to disturbances in the operation and low ease of use for some functions.

Specifically, the scaling mode was re-implemented from scratch. An area network now scales always in perspective and reduced in extreme cases to a point. The scaling of a single axis is now also possible without error.

Whenever possible, the contents of the texture window empties now. Unwanted links between selected faces and in storage kept texture images can be prevented.

The change between the anchor point and texture coordinates mode has been improved. At moving the image section on the middle mouse button (Pan) the set cursor (Move / Resize) no longer changes. (E-793)

- The Modeler is now able to load Warning lists with triangulation errors and to activate the affected Units. In right-click menu of the hierarchy window the entry "Warning Window" was added. If a Unit of the warning list is included in the loaded active model, a double click on the entry list loads the Units into viewport. If the warning is equipped with position information of problem location, the Modeler marked the affected areas as well. Currently warning lists produced by CityGRID® Administrator, CityGRID® Scout, CityGRID® Modeler and from the DWG2XMLK converter can be loaded. (A-1398)
- In the texture mode of CityGRID® Modeler now the option "From Image Server" is available, through which a connection to the CycloMedia image server can be established. Assuming that a valid CycloMedia license is available, which allows the use of the panoramic images for automatic texturing, selected areas (typically facades) can be automatically textured.

The selected faces support the CycloMedia Server with 3D position and queries the list of all images from where the selected segment is visible. From this list Modeler selects the most appropriate geometric image and proposes this for texturing. All other images are displayed in order of merit in the texture window. If necessary the automatic proposal can be overruled from these images if a better image content can be seen. Doing so obstructions such as trees, cars, pedestrians, etc. can be minimized during texturing.

If the building geometry or image orientation is not accurate enough to guarantee accurate image projections, textures in texture window may be adjusted interactively. The finished textures are stored as Unit textures into "images" directory of XMLs or the texture directory database. (A-926)

- The roof overhang tool now works with an even higher accuracy. As a result, the mode "takeover 2D footprint", also considers fine wrinkle in the roof surface and insert most needed vertices in the upper facade polygon. By this measure it can be prevented that the

upper facade edge pierces the roof and facade surfaces project beyond the roof surfaces.  
(E-1478)

- The Texture window empties content if an image selection is made and the surface mesh is displayed along with the image content in the texture window and you then click "Cancel". Likewise, the contents are emptied when the active element is changed during texturing process. Change of the selected faces of the same element has no effect of displayed content. The adjusted image orientation always affects those areas that have been selected when creating the material. (E-794)
- If you select via viewport, complexes of the active model now are always preferred. This is especially useful when working with the linked datasets because now no longer the last in the viewport drawn complexes are selected. These were always the linked units. (E-1547)

### ***Fixed Problems***

- In the texture window the anchor points that are used for setting the equalization parameters for perspective images were sometimes superimposed so that the equalization could not be determined correctly. Especially with gable walls of gabled buildings could occur this error. It is now ensured that no two anchor points can be superimposed, if there are more unused corners in the area network. (F-1425)
- The scaling function in the texture window used different values for the X and Y axis, whereby a scaling while maintaining the proportions was made impossible. Furthermore, the surface mesh inverted and not converged to a point in the reduction. (F-1418)
- Textured surfaces without image orientation parameters, as may be caused in the adoption of foreign models by City**GRID**<sup>®</sup>, could no longer load and adjust the texture coordinates in the texture window. It occurred to the error message that the pixel coordinate system is not set. (F-1417)
- When loading image information into the texture window sometimes, the error message "Failed to transform the global in the pixel coordinate system: projection type is not set to" occurred. As a result, no image could be displayed. Now, if orientation values are present while reading the image, they are used for the projection of the surface network, otherwise the texture window combines image and mesh of the selected area. (F-1216)
- During interactive application of a texture a shift happened in rare cases. The applied texture image therefore did not fit in line with the anchor points previously set and a subsequent correction of the texture coordinates was necessary. (F-910)
- The selection list "level of detail" of the element complex property window has been locked permanently for the duration of a session Modeler if "undo check out" was performed. The selection list will now be released as soon as the unit is checked out again. (F-1496)

- Historic versions could not have start / end dates older than 1.1. 1970 exhibit. Through changes of the code now 1. 1. 1753 the furthest in the past valid date (default MSSQL DBMS) (F-1470)
- The loading of historical versions at a certain time had no effect on loaded units of a model. All Units of am model were loaded regardless of their creation / termination date. (F-1471)
- The CityGML Export of textured buildings resulted in an error when the checkbox "texture" was not set in Units export settings. (F-1572)
- Changes to the linked units are no longer logged and no longer evaluated in a triangulation. This crashes caused by this behaviour on longer occur. (F-1546)
- When you move an object to the model node in hierarchy window to create a stand-alone unit, an error message popped up, when the newly formed unit was clicked in the hierarchy window. (F-1538)

## CityGRID® FME Reader/Writer

### *Fixed Problems*

- The Transformer "CGOverlapAnalyzer" calculated in some cases of overlapping features no overlapping values. The reason for this is, congruent segments had different vertices. To fix the problem, either synchronize the points by Transformer "CGPolygonVertexSynchronizer", or use Custom Transformer "CGOverlapAnalyzer\_CT" that is installed in the installation directory under CityGRID® FME Plugins \ Custom Transformer. (F-1281)

## CityGRID® Builder

### *Recent Developments*

- When you publish a Scout the Builder Control Center now provides an indication of the target path. At the given place the Builder Control Center will now copy all Scout data and performs publishing of Scout. By this measure, no more intervention by the user in the Builder project folder is needed. (E-1473).
- The graphical user interface was imposed to a gentle redesign to promote the usability of the application. The buttons now indicate which tab is currently active, lists provide feedback on selected items and the colour scheme has been adjusted. (E-613)
- The tab "Help" and "Log" were dissolved and the functions "Reset Log" and "Info" merged under a new tab "Settings". Furthermore, there is now a button "Manuals" available. (E-1423)

- When publishing Scouts it is now possible to adjust settings for Scout project and its appearance within the surface of the Builder Control Center. The options can be accessed via the tab "Build" on the side "Distribute" via the button "Config".

Among other variants for merged Scouts, settings for streaming, the light and fog parameters and general settings for Scout, as display size, render size of single and serial images or the two-sided display, can be set.

The editing of the respective files in the project builder (Settings.xml, Project.sgp, etc.) is thus minimized. When an edit is possible, this indicates a white background of the field "Values". With a dark background, only a reading of the set values is currently possible.

In future CityGRID® versions the editing features of the parameters will be gradually expanded. To edit values that can't be changed at Build Control Center surface, continue to use text editor for adjustments. (E-1434, E-1500, E-1529)

- Builder projects of instance objects and height grids may now have different offsets. At calculation of the merged Scout the automatic height positioning the difference is taken into account. The placement of objects of CityGRID® Tree Library is therefore considerably simplified. Instance objects are now displayed correctly with the other parts of a merged Scout. (F-1536)

### ***Fixed Problems***

- Manually placed library objects in 3D Studio Builder no longer are assigned to data class "instance". Instead they are added to the class "design". To generate the instance data a control file must be used. (F-1334)
- Animated objects (e.g. Trains) rotated uncontrollably when the forward movement was stopped to simulate the stop at a station. (F-1465)
- During the creation (Create) and publishing of scouts existing PointsOfInterest.xml file, and the contents of the "images" directory of points of interest has been lost. (F-1390, F-1400)

## **CityGRID® Scout**

### ***Recent Developments***

- In the present setup package, the first version of Unity-based CityGRID® Scout is included. The Unity 3D engine is the future 3D engine the CityGRID® Scout is based on. The installed Unity Scout has already undergone a long test phase, but is formally still in a beta stage and is still constantly evolving.

The Unity Scout arises when during publishing in the Builder Control Center. Besides the known SuGu Scout ("old Scout") Unity Scouts can be created as Offline Scouts from every customer with upright Scout license. Publishing to Unity scouts requires the re-processing of eventually existing Builder data. Already calculated Scouts can't be

converted into a Unity Scout without recalculation. The derivation of the source data of a Builder project is usually not necessary, only terrain model Scouts that have been created with texture sizes of 4096 \* 4096 must be made from scratch again. The maximum texture resolution in Unity Scout may not exceed 1024 \* 1024 pixel. Texture that exceeds this limits will be down sampled. Unity Scout is started on the Scout X64.exe or Scoutx32.exe which is located in the "local" folder of Scout.

Among the outstanding features of the Unity Scouts counts the better performance and quality of the display, an out of the box collision detection without any precalculations, the enhanced interface with overview map and steering control, and an extensive menu. The menu contains a query tool to gather the UnitID of a clicked building, or an extended measurement mode as well as a real-time shadows simulation or rendering images function.

Additional assets of Unity Scouts is the possibility of Scout projects to be hosted on Web servers. Via web browser (based on WebGL or Java) and mobile devices (mobile, tablet) the project can be viewed. In this regard, a separate license from UVM Systems GmbH must be obtained. The technical implementation of hosted projects is always individually adapted to the customer's situation.

The Unity Scout can be prepared for local and online publishing. In case of local publishing all the data are stored in the "local" folder of Scout. Use Scout.exe to start the local Unity Scout. The .exe file is also located in the "local" directory. At the start of the Exe Scout detects whether a 32 or 64-bit operating system is present and starts accordingly. In "local" folder there is also a Scoutx86.exe. This file will launch the Unity Scout always a 32-bit application. Because 32-bit applications always work faster than 64-bit applications this exe can be used when the Scout project doesn't require 64-bit support. All data for online distribution are located in the "online" directory of the Scout folder. Please contact with UVM system in order to use Unity online Scouts. (E-1431, E-1441, E-1444, E-1573, E-1554)

- In File Settings.xml the image resolution for single and serial images can now be explicitly set. To the old mechanism for rendering of multiples of (HD) resolution is completely replaced. Suitable parameters are <RenderSizePosters> and <RenderSizeMovie>. It remains the case that the requested resolution by the graphics card must be accessible and the memory requirements can be handled by the computer. The new implementation of the rendering process can also output FullHD resolution images immediately after the start of the Scout. (E-1440, F-1536)

### ***Fixed Problems***

- Collision detection failed for Scout projects that only contained a single unit. The calculated collision body was placed in the wrong place, which allowed flights through the building and prevented them at another location of the Scout. (F-1448)

- Collision detection in buildings resulted in rare cases in crashes of the SuGu Scouts. This occurred only in small scenes with few buildings. (F-1503)

## CityGRID® Solid

- In the present setup package, the first version of the new module CityGRID® Solid contained. CityGRID® Solid is a software package for the preparation of city model data for 3D printing. The aim is to create a printable area of a city model that can be transmitted without further processing steps to the 3D printer.

CityGRID® building models and terrain models, with or without texture can be read. The data are subjected to various processing steps, such as clipping on a region of interest and the allocation to the space of the 3D printer, the formation of watertight bodies, the hollowing of these bodies taking into account the printing scale and a minimum wall thickness as well as the output to the standard printing formats stl and obj.

CityGRID® Solid can currently prepare simple 3D buildings for printing. In complex structures, the processing routines will try to automatically solve as many tasks as possible, but it is expected that an interactive post processing effort will remain. If problem areas are detected CityGRID® Solid indicate them in the form of a warning list, which can be utilized in CityGRID® Modeler, together with the processed CityGRID® XML file, for fixing.

Terrain models can be converted into a contour line model as part of the print preparation of a TIN. The equidistance can be specified by the user. The found counter lines can be imposed to a smoothing algorithm and exported to dwg.

CityGRID® Solid requires a separate license that must be obtained from UVM system. (E-1317, A-1487, E-1579)