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## REALTIME COMPOSITING OF PROCEDURAL FACADE TEXTURES ON THE GPU

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**Abstract.** The real time rendering of complex virtual city models has become more important in the last few years for many practical applications like realistic navigation or urban planning. For maximum rendering performance, the complexity of the geometry or textures can be reduced by decreasing the resolution until the data set can fully reside on the memory of the graphics card. This typically results in a low quality of the virtual city model. Alternatively, a streaming algorithm can load the high quality data set from the hard drive. However, this approach requires a large amount of persistent storage providing several gigabytes of static data. We present a system that uses a texture atlas containing atomic tiles like windows, doors or wall patterns, and that combines those elements on-the-fly directly on the graphics card. The presented approach benefits from a sophisticated randomization approach that produces lots of different facades while the grammar description itself remains small. By using a ray casting approach, we are able to trace through transparent windows revealing procedurally generated rooms which further contributes to the realism of the rendering. The presented method enables real time rendering of city models with a high level of detail for facades while still relying on a small memory footprint.

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