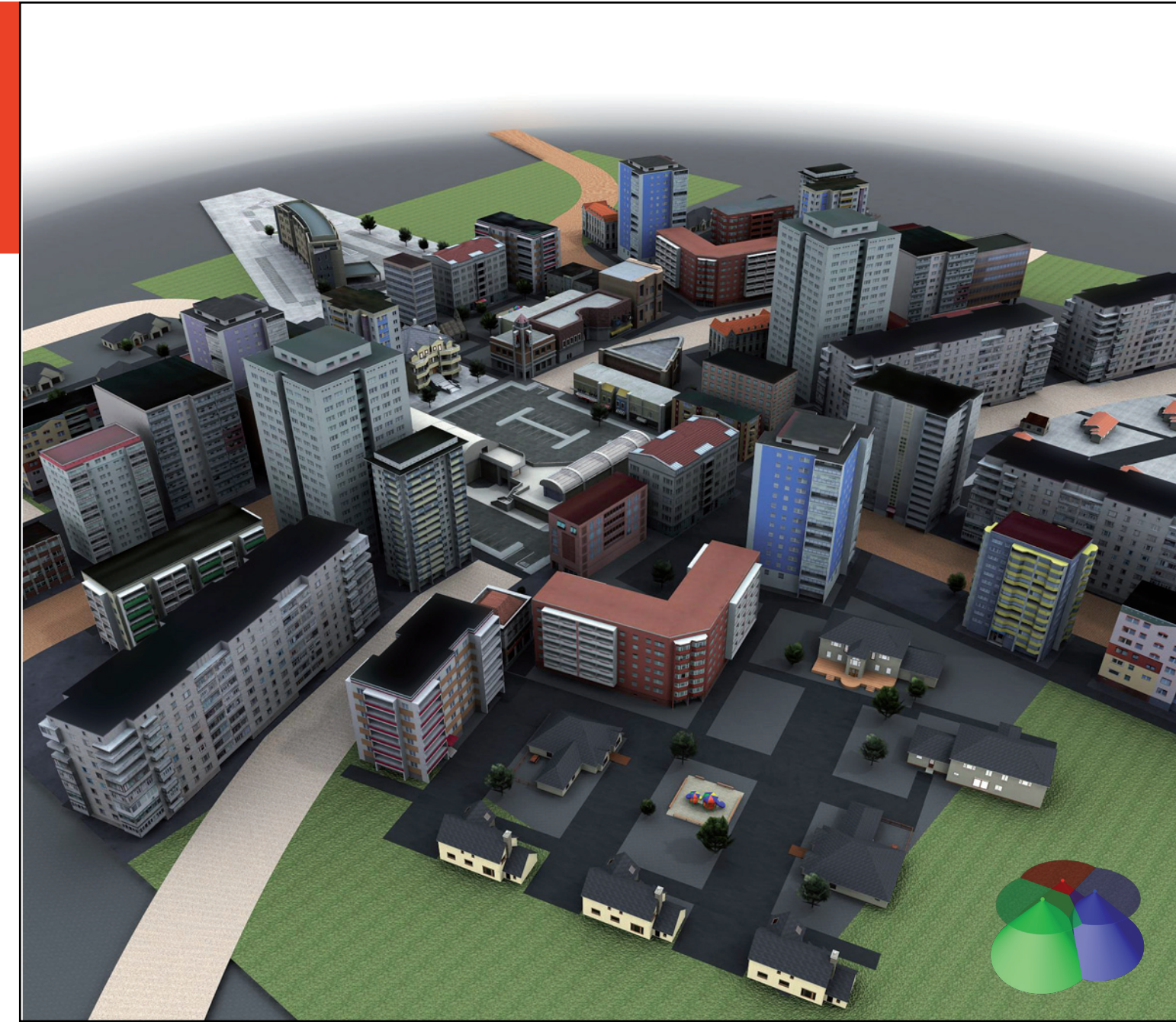


Creating Visually Convincing Paths for Virtual Characters

The technique

We create a footprint from a 3D environment. From this footprint, we extract a graph, which can be computed using the GPU in 0.5 seconds.

From this graph, we extract a corridor which defines the global route. Within the corridor, a force field guides the character to its goal.



We want visually convincing paths

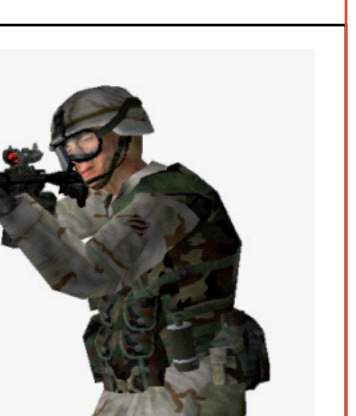
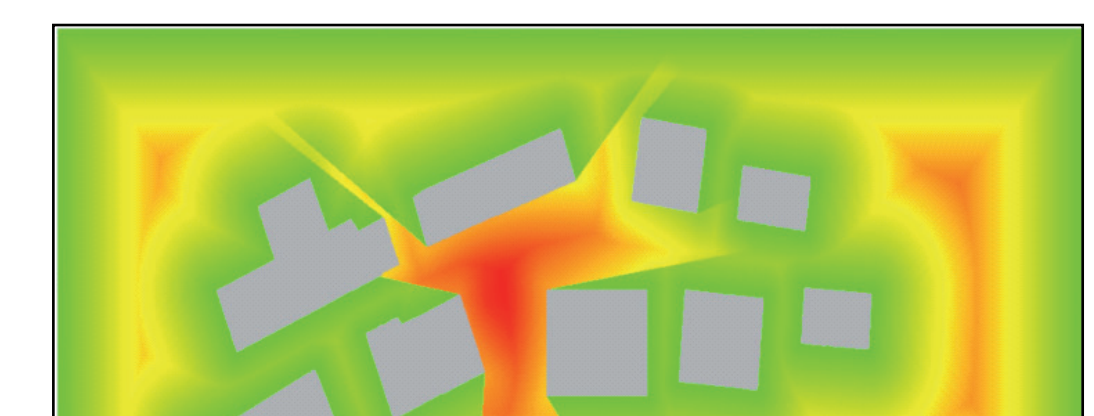
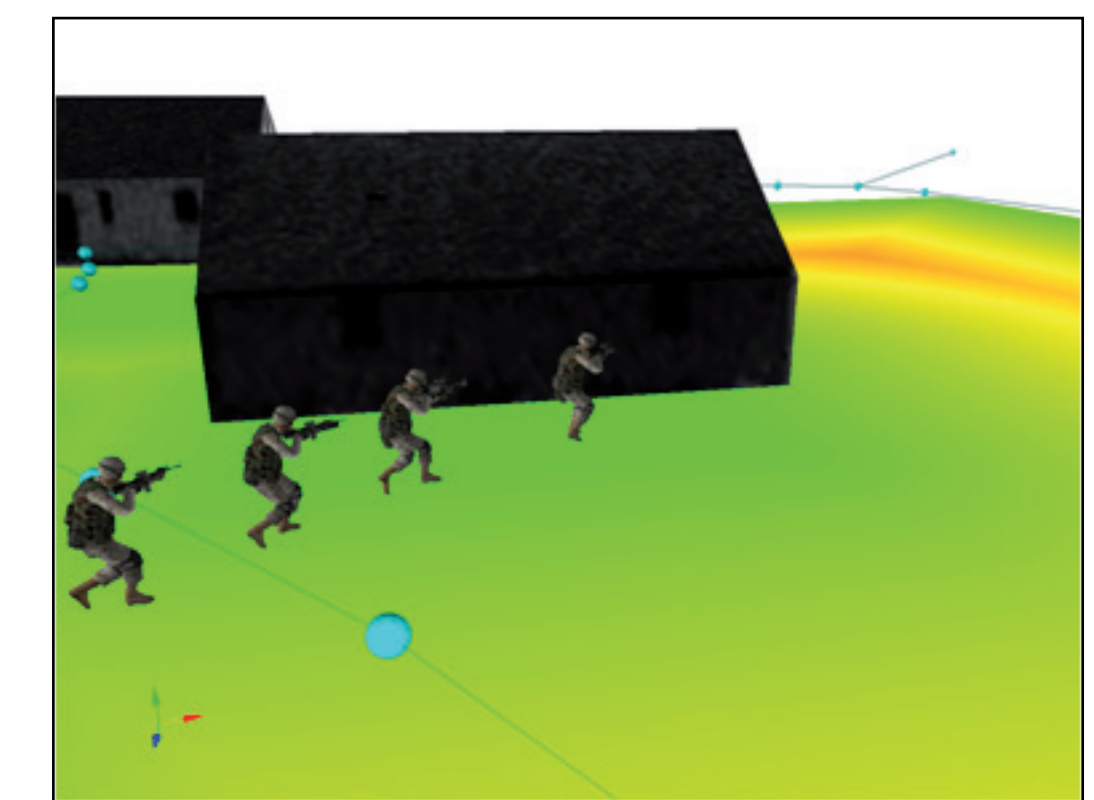
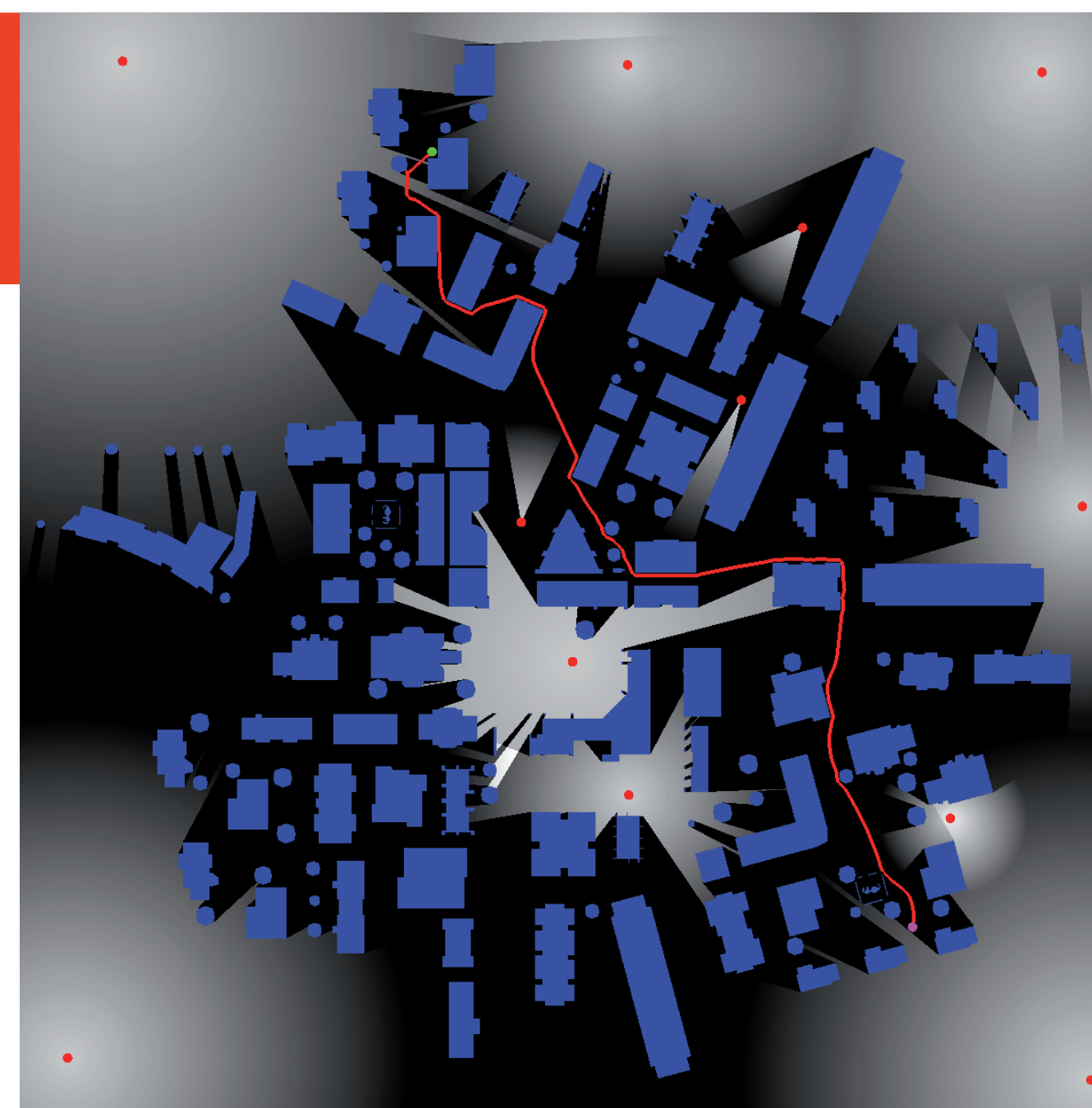
Such a path could have been traversed by a human.

- Smooth
- Short
- Keeps some distance to the obstacles
- Avoids other characters
- Flexible...

Military applications

Stealth planning: Besides being visually convincing, the path must have little or no exposure to observers. We can plan a stealthy path with 128 dynamic observers in real time (cpu-load is 8%).

Tactical planning: We produce realistic and safe paths providing cover for small groups of characters.



Interactions

We propose a new local method for collision avoidance. By predicting possible future collisions, we create considerably shorter and less curved paths for the characters (than reactive methods), resulting in a natural flow. The method reproduces emergent behaviour, like lane formation, which has been observed in real crowds. The technique is easy to implement and is fast.

Crowd simulation

Interactive environments are populated with a large number of characters to make them look more lively and appealing. We provide methods for wandering and global navigation, yielding realistic crowd simulation. Our method can steer a crowd of 10.000 characters in real-time.

