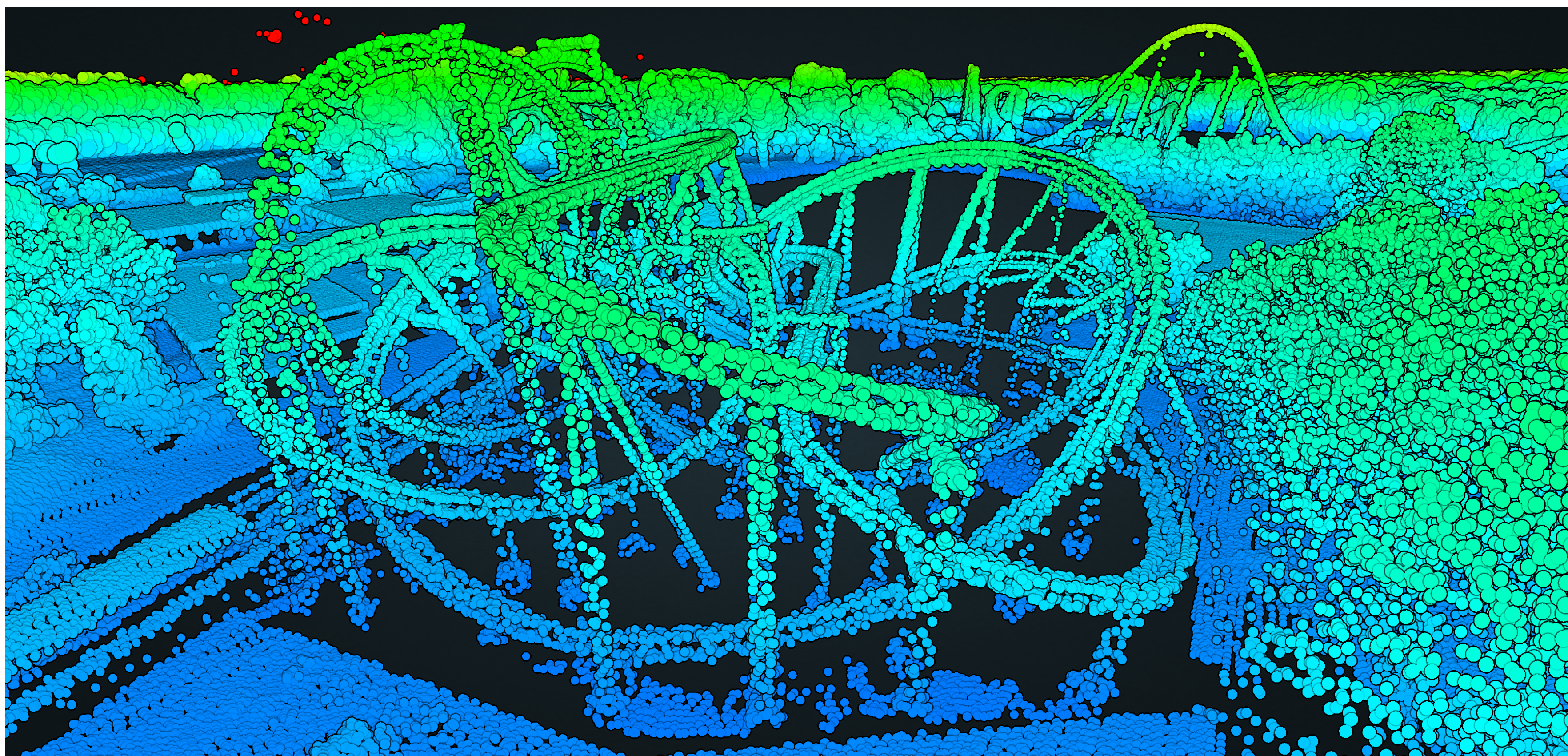


Massive Point Clouds for eSciences

Modern Big Data acquisition technologies, such as laser scanning from airborne, mobile, or static platforms, dense image matching from photos, or multi-beam echosounding, have the potential to generate point clouds with billions (or even trillions) of elevation/depth points. The main problem is that they are simply too big (several terabytes) to be handled efficiently by common ICT infrastructures.

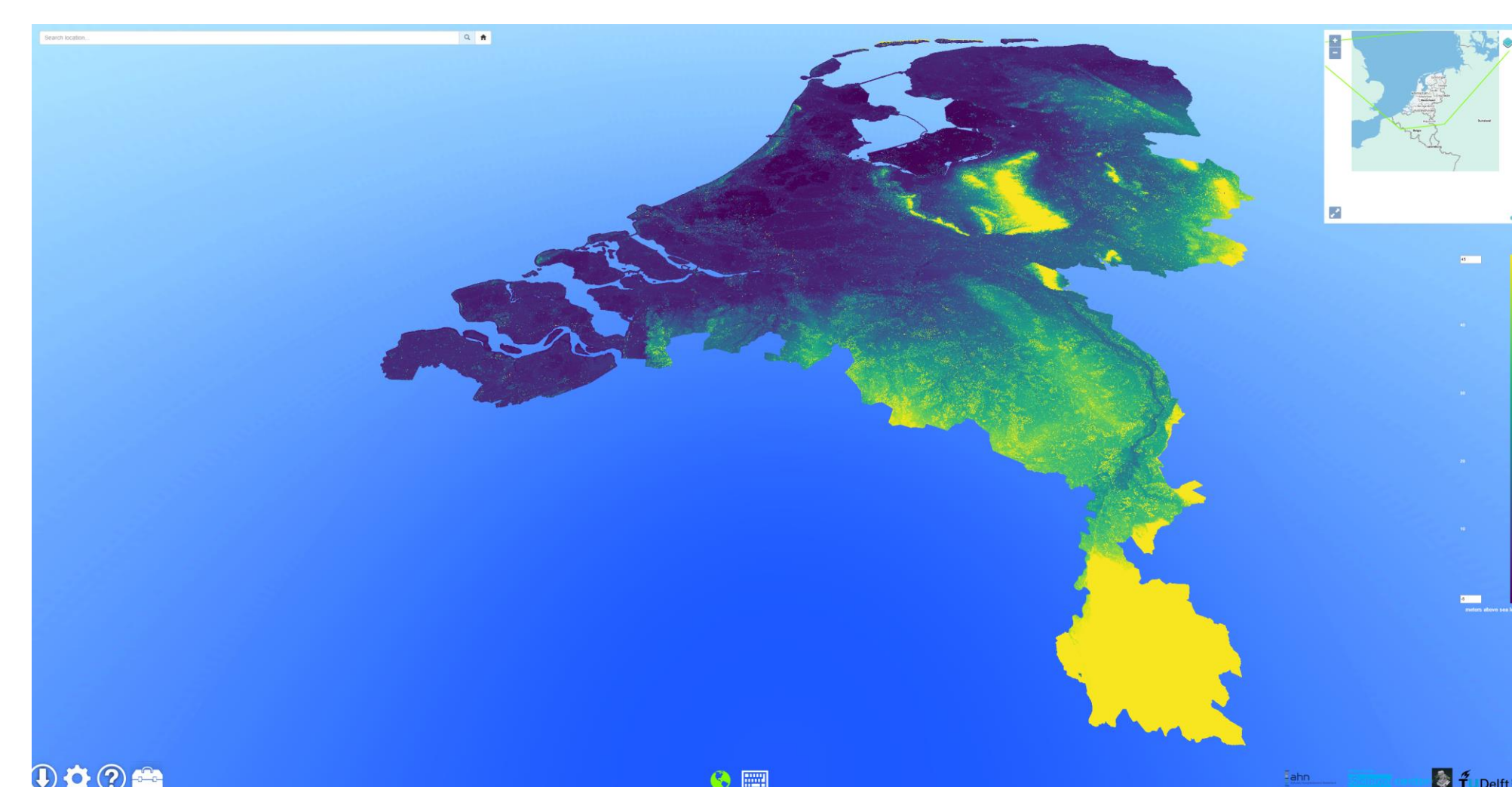
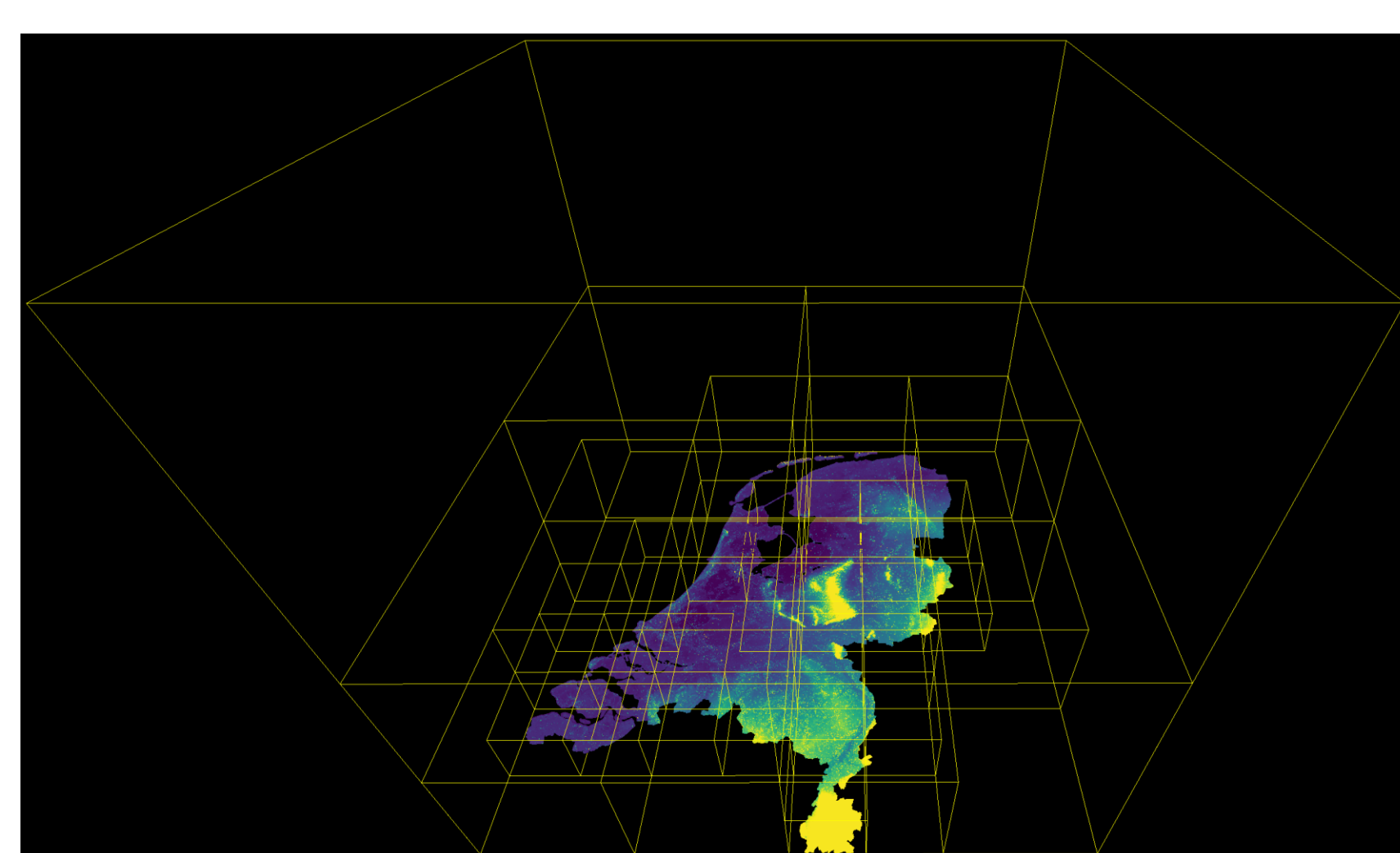


The main goal of this eScience project is to develop an infrastructure for the storage, the management, the analysis and processing, the dissemination, the visualization and the manipulation of massive point clouds. The main test case is the height map of the Netherlands (AHN2 dataset).

At the database level, initial implementations for point clouds data management are available in Oracle, PostgreSQL and MonetDB. Also file-based solutions are being used, e.g. Rapidlasso LAsTools.



Recently the first solutions for web visualization of point cloud data have been developed by Potree and Plasio.



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1. Based on user requirements various benchmarks are designed and executed in several data management systems with various subsets of the AHN2 dataset.
2. Novel eScience techniques are being investigated and developed: Improved and more compact data organization, better clustering and indexing; exploiting multicore architectures for point cloud operations; data pyramiding solutions, discrete vs. continuous level-of-detail.
3. The ISO/OGC standardization of point cloud data at various levels is being addressed.
4. The Netherlands is the first country that can be freely explored in 3D in the web (<http://ahn2.pointclouds.nl>). This is enabled by latest web visualization technologies and by a novel algorithm for efficiently distributing the generation of the required data structures in HPC environments.