

Common Geometry Primitives library

WP3 – 7/7/2017

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Work in progress: tessellated solid

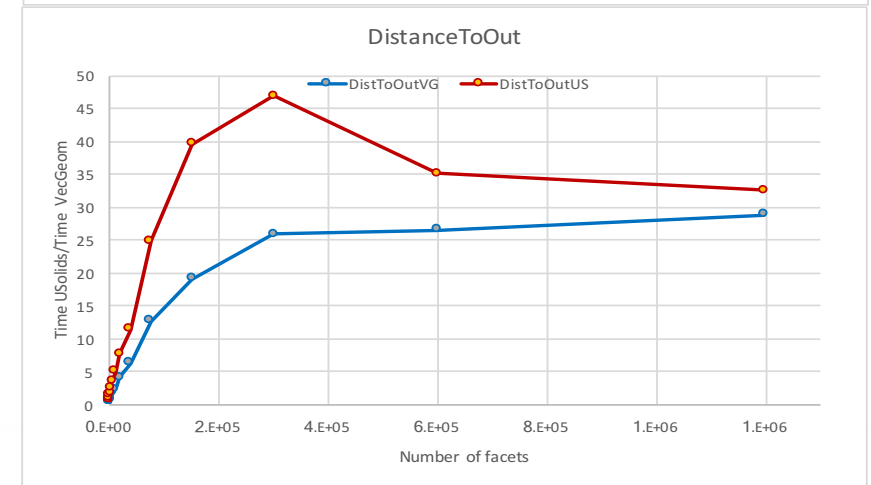
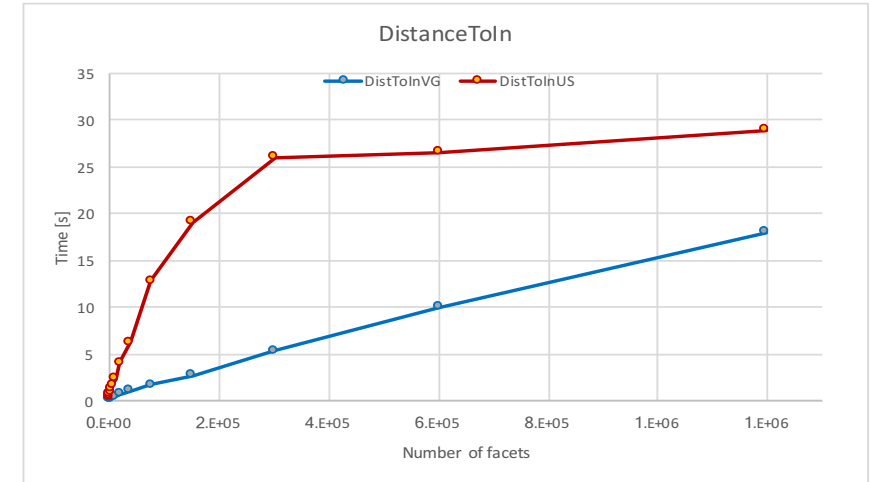
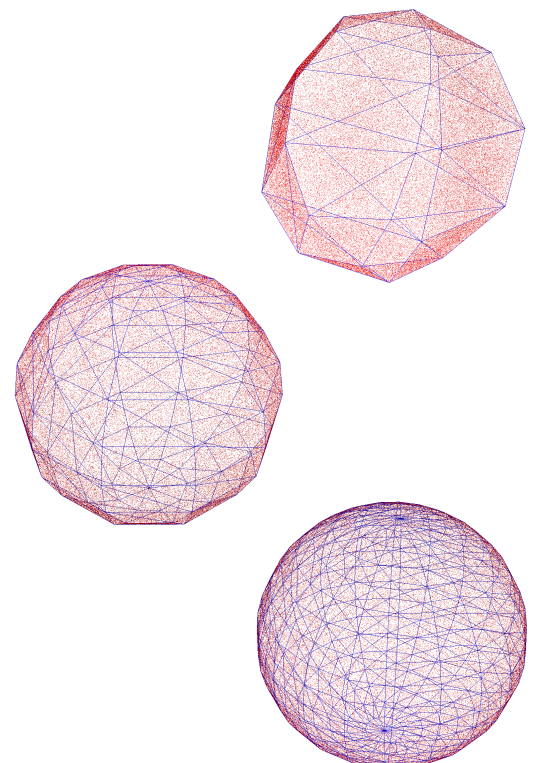
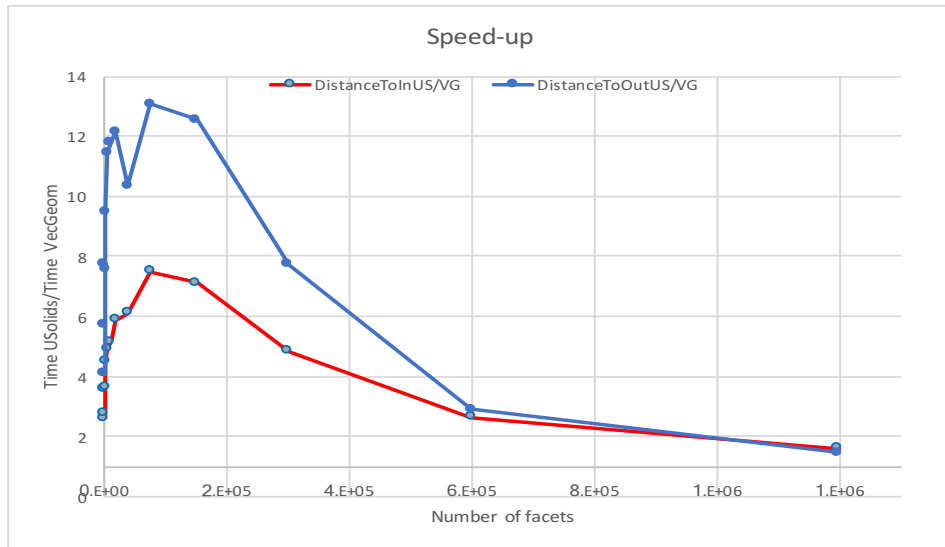
M.Gheata

- Code close to completion, providing most functionality
 - Ongoing optimisations (voxelization helper)
- Different strategy adopted respect to implementation in Geant4/USolids
 - Vectorized bounding box navigation helper, grouping clusters of SIMD_length<float> size (1 particle + N boxes)
 - Vectorized computation of distance/safety to facets, grouping clusters of SIMD_length<double> size (1 particle + N facets)
 - 3D voxelization used in Geant4/USolids not yet implemented; planning to add it for further optimisation
- Performance comparisons ongoing
 - Understanding scalability issues and possible improvements

Preliminary measurements

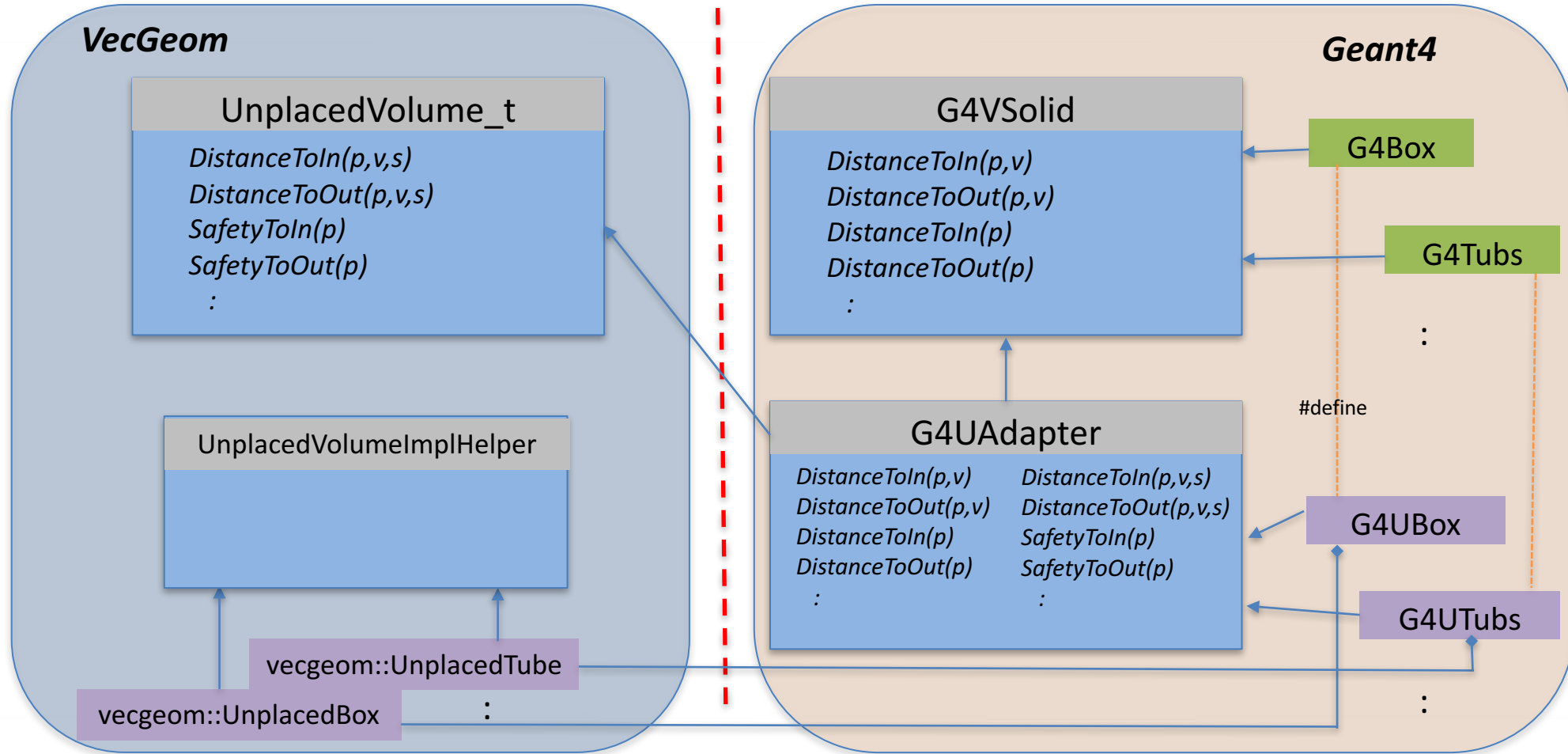
DistanceToIn/Out

- Linear complexity in VecGeom (expected)
- Default voxelization in USolids goes like $\log(N)$ for Nfacets > 30K



Revised wrappers in Geant4

- Included in release 10.4-B of Geant4
 - Requires version v0.4 of VecGeom
 - Old USolids API now obsolete and will soon be removed in VecGeom
 - Expected to have all wrappers for shapes migrated in final Geant4 release 10.4



Resources

- Assuming current resources sum up to ~ 1.5 FTE, adding up contributions from PH/SFT:
 - John Apostolakis
 - Gabriele Cosmo
 - Andrei Gheata
 - Mihaela Gheata (AIDA PJAS)
 - Evgueni Tcherniaev
 - Sandro Wenzel