

# Common Geometry Primitives library

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# Update on activities

- Refactoring code to make use of new VecCore backend
  - Refactored code for: parallelepiped, generic trapezoid, scaled shape
  - More shapes refactored by colleagues at CERN, FNAL and BARC: box, tube, trap, paraboloid, sphere, orb
  - VecCore provides new mask-based operations, load/store, math functions, vectors, etc... providing a more flexible interface (across type of solid or backend in use)
  - USolids adapters have been modified accordingly
- Revisited algorithms and fixed several issues
  - Reported by tests in the context of Geant4 and ROOT
- Integration with Geant4 features now completed
  - Supporting also visualization and parameterisation in MT mode
  - Expected to have set of solids at production quality for Geant4 10.3

# Ongoing activity...

- Code robustness & correctness
  - Reviewing/fixing issues on existing shapes detected by the **ShapeTester** testing suite
  - Shapes particularly under exam: Torus, Cone, Polycone
  - Extending coverage to different possible topologies
- Completing refactoring of code to VecCore
- Verification of correctness in complex geometry setups
  - Analyzing issues from several solids present in the CMS setup
  - Cataloguing issues from simulation of the SMS setup through Geant4 and from Geant4 nightly build tests
- Extending testing coverage by adding new shape topologies

# Resources

- Assuming current resources sum up to  $\sim 1.5$  FTE, adding up contributions from PH/SFT:
  - John Apostolakis
  - Gabriele Cosmo
  - Andrei Gheata
  - Mihaela Gheata (AIDA PJAS)
  - Tatiana Nikitina
  - Sandro Wenzel