Code sprint 26.2 - 1.3.18

Status update on VecGeom items

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Reminder: List of topics

- **general cleanup campaign**
  - remove/deprecate original USOLIDS code
  - remove other deprecated / unused code
- **factory for unplaced solids**
- **VecGeom navigator in G4 simulation**

USOLIDS (v1) cleanup

- we (in particular G4) are no longer using the original USOLIDS code, nor its interface; VecGeom supersedes USOLIDS v1.

- so geometry working group decided to remove all couplings of VecGeom to original USOLIDS
  - will simplify code
  - we reduce the number of build options (we no longer require distinct builds for special USOLID compatible mode)

- Based on previous effort from G.Lima, this task was completed in merge request 546.

Unplaced volume factory

- "As a user, I would like to be able to **create the best possible specialized instance** of a volume given **some generic parameters/description.**"
  - get FullTube instance when asking for a Tube without inner radius

- In VecGeom, such a mechanism existed for **PlacedVolumes** but not yet for **UnplacedVolumes** after the recent class layout changes

Unplaced volume factory

- Worked out a **uniform template interface** in **GeoManager** which is achieving this

```
// a factory for unplaced shapes
template <typename UnplacedShape_t, typename... ArgTypes>
static UnplacedShape_t *MakeInstance(ArgTypes... Args);
```

- In principle now **the only interface** we should use

Unplaced volume factory

- A default implementation and specialized treatment for tube done:

```
auto ubox = GeoManager::MakeInstance<UnplacedBox>(1., 1., 2.);
assert(dynamic_cast<UnplacedBox *>(ubox));
```

```
auto utube = GeoManager::MakeInstance<UnplacedTube>(0., 1., …);
assert(dynamic_cast<SUnplacedTube<TubeTypes::NonHollowTube> *>(utube));
```

- Should now be easy to transfer to other volumes which might be appropriate for specialization
- To see if G4 can profit from this

VecGeom navigation in G4

- no news yet