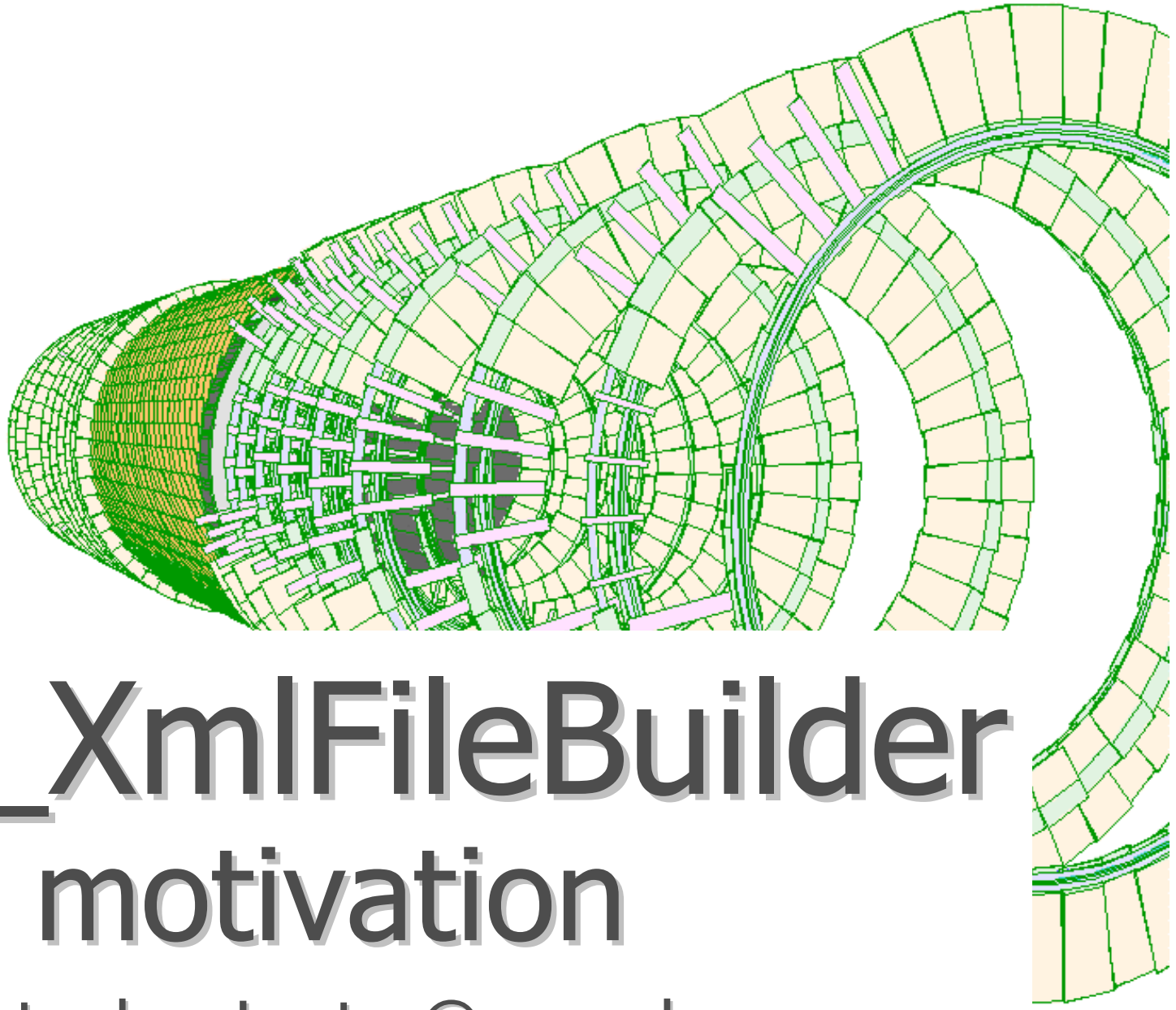


AGDD_XmlFileBuilder
- motivation

Christopher.Lester@cern.ch

The problems ... part 1

AGDD/XML files contain ...

- Repeated numbers. Eg: tubes of similar design sharing common diameters but having different lengths.
- Functionally related numbers.
  Eg: $translation_x = width/2 + \cos(\theta_{stereo})$
- Algorithmically related numbers. Eg:

```
const int N=10; // number of trds
for(int n=0; n<N; n++) { // loop over each trd
        trdSkew[n]=atan(n); // set skew angle
}
```

The problems ... part 2

AGDD/XML files contain ...

- Repeated strings. Eg: ID definitions, and subsequent IDREFs.
- Functionally computed strings.
  Eg: waferName = "SCT_" + (inner ? "inner" : "outer") + "_wafer";
- Algorithmically computed strings. Eg:

```
const int N=10; // number of wafer types
for(int n=0; n<N; n++) { // loop over each wafer
    // set name for wafer type ...
    waferTypeName = "SCT_waferType_" + n;
}
```

The problems … part 3

AGDD/XML files **do** have sources …

- Databases
  - Assembly Breakdown (ABS)
  - Production database
- Drawings
- Even peoples memories!

… and all these change and update frequently.

XmlFileBuilders can read some of these, and help keep XML files up to date.

XmlFileBuilders - what do we want from them?

- **Freedom:**
  - Freedom to use the **full power** of any developed language (C++, Java, Fortran, Perl, …) when building our XML file.
- **Simplicity:**
  - Close relationship between builder code and output XML, but ...

XmlFileBuilders - what do we want from them …

- **Benefits:**
  - "Out of order" building
  - Reference management
  - Syntax handling (<pos>…</pos>)
  - Strong syntax checking
  - **Independence of output format / DTD**
  - Ability to define complex constructions

What is AGDD_XmlFileBuilder?

- It's a set of C++ tools which allow easy creation and management of complicated AGDD/XML files
- The set of C++ tools comprises
  - library
  - user tool classes
    - (and implementation classes …)

Where is AGDD_XmlFileBuilder?

- It is in the ATLAS software area, under offline/DetectorDescription/AGDD_XmlFileBuilder
- Some "real" use by the SCT community can be found in: offline/InnerDetector/InDetDetDescr/SCT_AGDD_XmlFileBuilder, although these may not be the best examples to learn from.
- Simple tutorial may be found via http://cern.ch/lester/index.html

What AGDD features does AGDD_XmlFileBuilder support?

Primary solids

- Box, Tubs, Cons, Trd, HalfTrd*

Boolean solids

- Union, Intersection, Subtraction

Positioners / Identifiers

- PosXYZ, MPosPhi, Identifier (inc. Layer/Ring/Sector forms)

Administrative

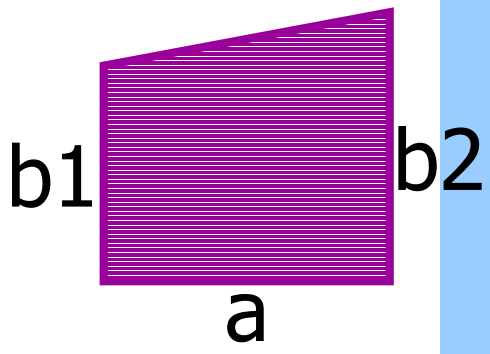
- Compos, Section, AGDD

If what you want is not here, campaign for it!

Advanced features

Use shapes which are not in the DTD, without forcing Marc to produce a new version of Persint!

```
#include "AGDD_XmlFileBuilder/HalfTrd.hh"

// Make a halfTrd:

agdd::HalfTrd * shapeNotInDTD = new agdd::HalfTrd;


// Set the top volume, and print XML file!

shapeNotInDTD->setName("wedge");

shapeNotInDTD->setHalfTrd(a, b1, b2, thickness);
```

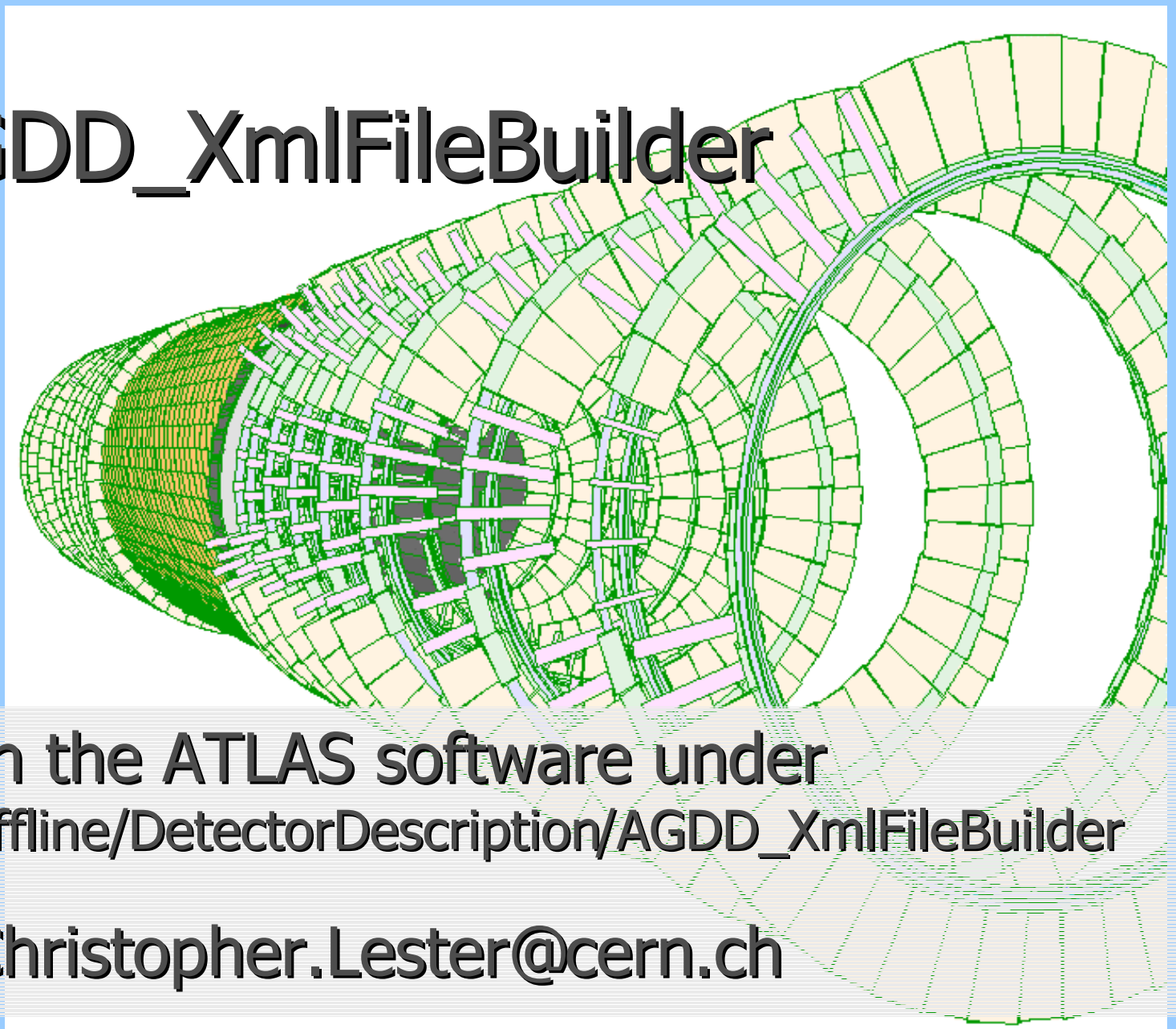


Advanced features

When two things are similar but not quite the same …

```
// A function to return a complicated object:
agdd::Compos * makeComplicatedLayer(int layerNumber) {
        agdd::Compos * layer = new agdd::Compos;

        layer->setName("SCT_layer_"+layerNumber);
        if (layerNumber==2) {
                // Build the layer in a special way
        } else {  /* Build the layer in the normal way */  };

        return layer;
};
```

AGDD_XmlFileBuilder



- In the ATLAS software under
  offline/DetectorDescription/AGDD_XmlFileBuilder
- Christopher.Lester@cern.ch