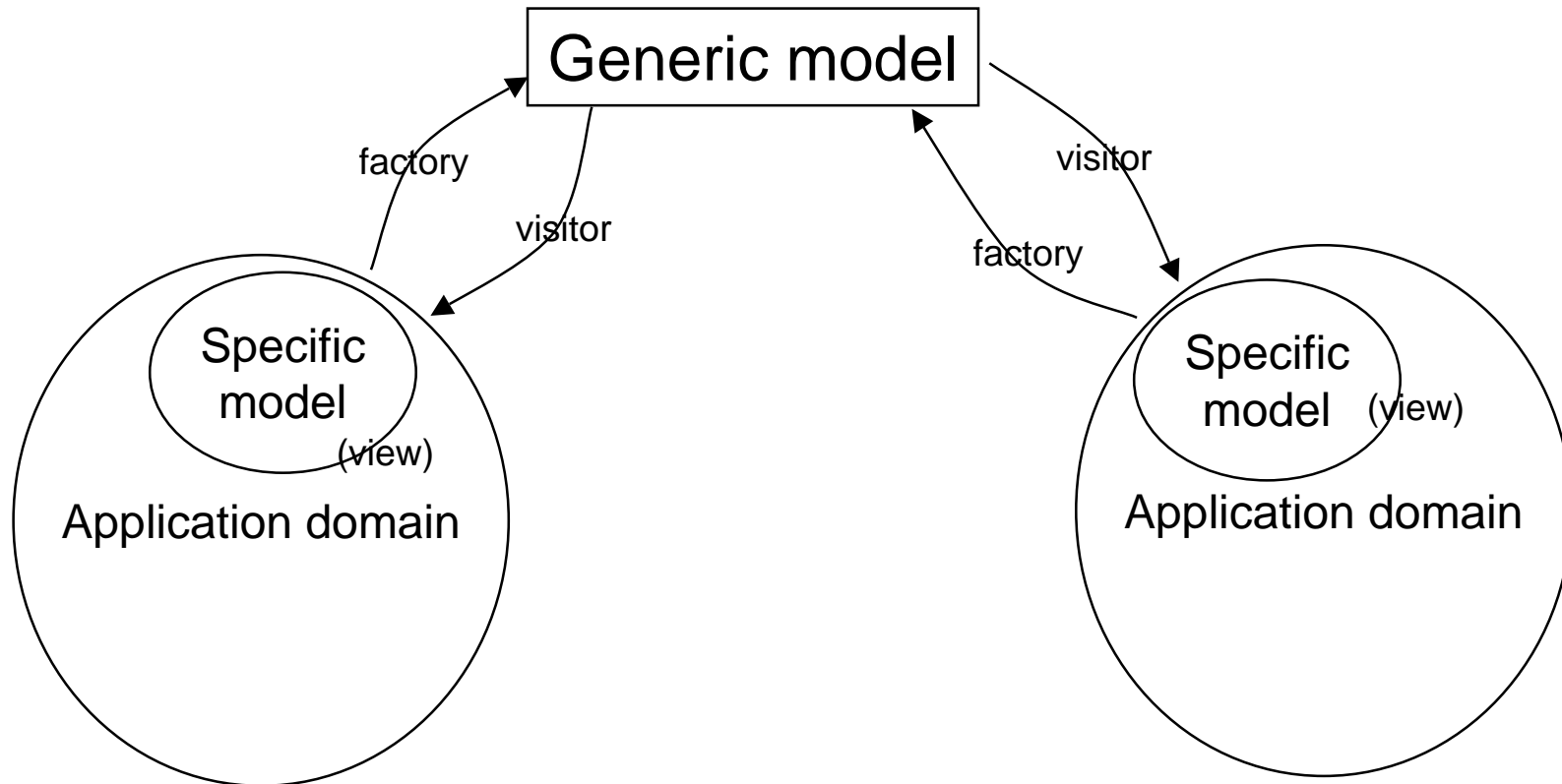


## Architecture

- **Composed of**
  - **Some generic components**
    - » **Identifier**
      - generic identification of objects organised in a multi-hierarchical structure (a forest).
    - » **Range**
      - range of identifiers
    - » **IdentifierMap**
      - collection of identifiable objects
  - **A design and architecture pattern**
  - **A generic model**

# Detector Description

## The architecture and design pattern



# Detector Description

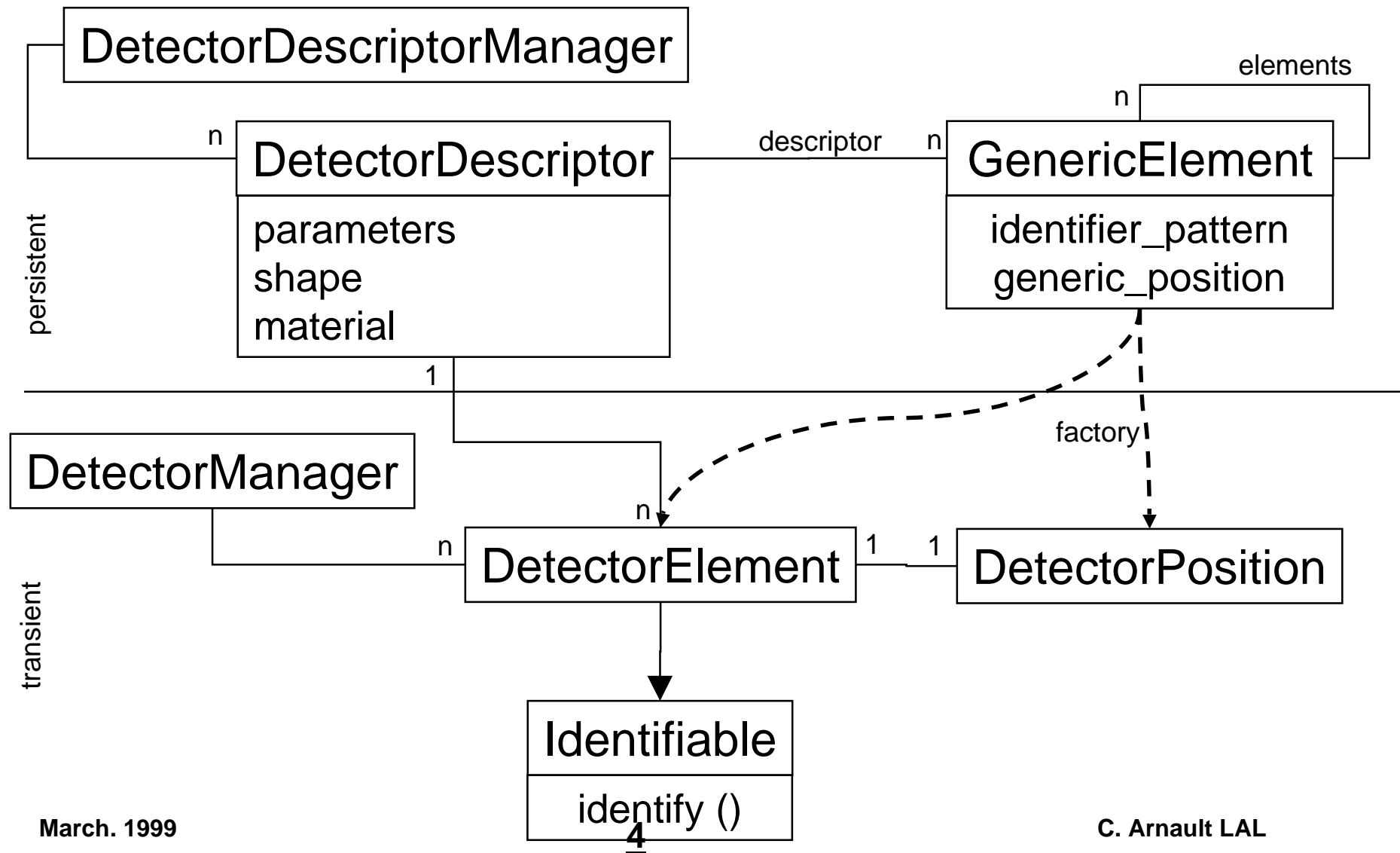
---

## Examples of specific application domains

- **Age files**
  - Structure definitions
  - Zebra data files
- **Objectivity**
  - reading and writing persistent objects
- **Common blocks (eg. MuonBox)**
  - filling common blocks
- **Geant4**
  - building G4 representations from the generic description
- **Textual representation (AMDB, OIF)**
  - end user manipulation of description (debugging, quality checking)

# Detector Description

## The generic model



## The Generic Position

- Describe the cardinality and the algorithm used to position generic elements in terms of storable parameters
  - may contain
    - » a number of elements
    - or
    - » a range in phi, z or r
    - and
    - » a rotation
    - » a displacement
  - it is optional, and may be replaced by a specialised method in a derived class (specialised) of `GenericPosition`

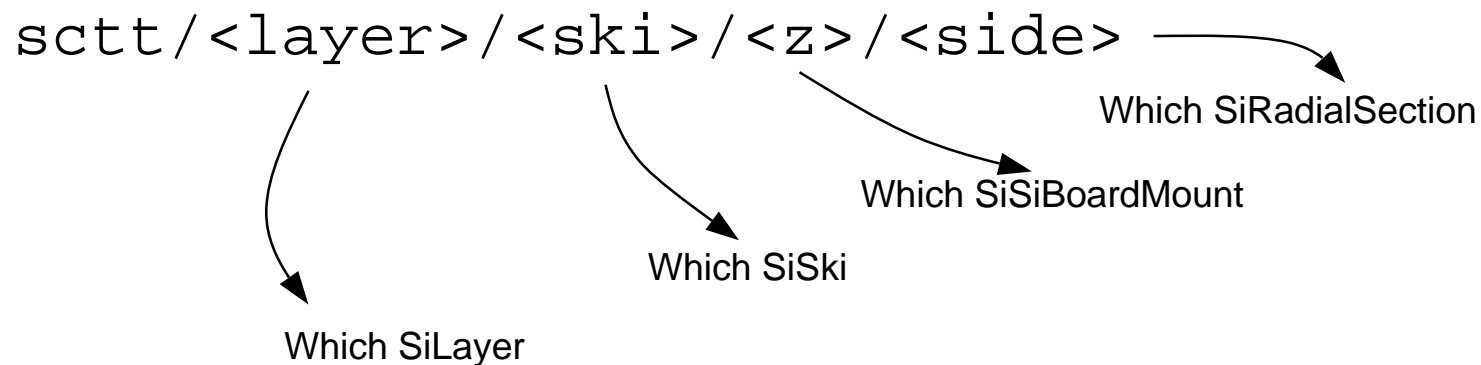
## Examples of generic models

- **SCT (built from scttgeo.age)**
  - **SiBarrelTracker (SCTT)**
    - » **SiInsulatingLayer (SISO)**
    - » **SiLumpedSupport (SLMP)**
    - » **SiElectronicBoard (SCTE)**
    - » **SiCloseOut (SCLO)**
    - » **SiCableSupport (SCAB)**
    - » **SiLayer (*New type*)**
      - **SiPhysicalLayer (SCTi)**
        - SiSkiLayer (SLAi)
        - SiSCTStructure (SCTS)
        - SiCloseOut (SCLO)
      - **SiLayerFlange (SCFL)**

## The SCT barrel tracker

- **SiSkiLayer (SLA<sub>i</sub>)**
  - **SiSki (SSK<sub>i</sub>)**
    - » **SiBoardMount (TMOU)**
      - **SiRadialSection (SECT)**
        - SiSensitiveDetector (SCTB)
        - SiElectronicBoard (SCTE)

## • Identifying elements



# Detector Description

## The SCT barrel tracker

- A detector descriptor (ODL & OIF notation)

```
interface SiPhysicalLayer :  
    DetectorDescriptor  
{  
    double rlay;  
    double rtcksup;  
    double tilt;  
    double laytyp;  
    int    nmodphi;  
    double rosup;  
    double flen;  
    double fltck;  
    double colen;  
    double cotck;  
}
```

```
SiPhysicalLayer SCTi_3  
{  
    rlay      44.7;  
    rtcksup   0.3;  
    tilt     -10.0;  
    laytyp   -1;  
    nmodphi  48;  
    rosup    42.7;  
    flen     4.0;  
    fltck    0.9;  
    colen    2.1;  
    cotck    2.22;  
}
```



## The TR tracker

- **TRMother (XTRT) (built from xtrtgeo.age)**
  - **TRElement (XTRE)**
    - » **TRInnerSupport (XINR)**
    - » **TROuterSupport (XOUT)**
    - » **TRRadiator (XFOA)**
      - **TRStrawLayer (XURL)**
        - **TRLayerDivision (XXDV)**
        - **TRPseudoBoundary (XLAY)**
    - » **TRBarrel (XBAR)**
      - **TRPhiDivision (XPHB)**
        - **TRModuleWall (XMOB) ...**
  - **TRService (XSCI)**

## The TR tracker

- **TRLayerDivision (XXDV)**
  - **TRStrawVolume (XHOL)**
    - » **TRStraw (XSTR)**
      - **TRSensitiveGas (XGAS)**
        - TRWire (XWIR)
        - TRTwister (XMST)

# Detector Description

## Scenario for using the framework

- First one defines the specific `DetectorDescriptor` classes (such as `SiPhysicalLayer`)
  - » this specific class will contain the basic parameters (those currently typically found in the Age structures)
- Then the set of `GenericElement` objects are provided

```
GenericElement e
{
  descriptor d1;
  position { cardinality N; }
  elements { e1, e2, ... }
}
```

# Detector Description

## Scenario for using the framework

- A specialised visitor should then be derived from the generic one provided in the framework.
  - » The generic visitor is able to traverse the hierarchy of generic elements, following their parameterized specification (eg. The number of elements, the range in phi, z or r, etc...).

```
Visit:  
  iterate on generic position  
    iterate on elements  
      visit (element)
```

- » It's up to the specialised visit method to act on the visited objects to
  - generate the Geant operations
  - fill in an Objy database
  - construct an object model for the reconstruction

# Detector Description

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## Status

- **Prototype implementation for Identifier and Ranges (used in the Tbyte project)**
  - require optimization
  - design of the specialized collection
- **Generic models drawn for**
  - Muon spectrometer (cf previous works on AMDB)
  - SCT
  - TRT
- **Visitors and specific views prototyped for**
  - AMDB (Geant3 + Textual files + Common blocks)
  - SCT (Age to OIF representation)

# Detector Description

---

## Next

- **Need help from detectors to understand the real specific model**
  - identification scheme for elements in the hierarchy
  - parameters (material, shapes, etc...)
  - specific operators for
    - » geometry generation
- **We propose a sequence of working sessions with candidate users (eg. SCT, Muon) in the coming weeks**
  - a detailed and technical training session
  - some private work on the generic model for the subdetector
  - integration with applications