The Fiducialisation for the next LHC magnet generations

From LTD500 + AXYZ towards AT930 + SpatialAnalyzer

The fiducialisation of the LHC Cryomagnets is a well established process since 2003
- LEICA LTD 500 Series Instruments
- LEICA AXYZ software for the acquisition
- CGC (Cryomagnet Geometrical Calculation) for the data treatment

Current CGC software is written in Microsoft VB6
- Collaborating with LEICA AXYZ
- Not connected to the Databases
- Hardcoded references and rigid structure

... today we have new instruments, new Software and new magnet types to deal with
- LEICA AT 930 Instruments
- SpatialAnalyzer software for data acquisition
- CGC is not compatible with the new Instruments and Software

The new CGC# is written in C#
- Collaborating with Spatial Analyzer
- Directly connected to the Databases
- Fully configurable for magnet specifications
- Extensible to new future magnet types

Requirements

- The new CGC# should be open and configurable for new magnet types avoiding the rigid structure and disadvantages of the existing version.

Universal Data Structure

- A new universal data structure is needed to stay flexible for future magnet types.
- It does not matter anymore how many flanges, beamtubes or fiducials a magnet has.
- It does not matter anymore how the points and point groups are named.
- XML files are used for the:
  - Magnet type definition
  - Measurement profile
  - Theoretical parameters

Collaboration with SA

- Clear separation of SA from the core program
- The SA measurement Plans (MP scripts) are used for the data acquisition
- The calculations needs more flexibility to cope with the different magnet types
- Development of a SpatialAnalyzerController .NET class library
- Encapsulating all needed MP commands
- The calculation logic calls individual MP commands as needed along the calculation process
- No SA specific code inside the core modules of CGC#

Architectural Layout

User interface
Fiducialisation process
Activities logic
Callback functions
Abstraction to external applications
XML

What’s next?

- Implementation of Database upload
  - The program exchanges a full featured set of data with a internal PLSQL database package
  - The PLSQL package is responsible for the distribution of the results in the different DB tables
- Making CGC# fully independent from the DB layout
- Integration of all magnet types is still to be done
- So far the programm was tested with LHC dipoles
- More tests with other types to be done