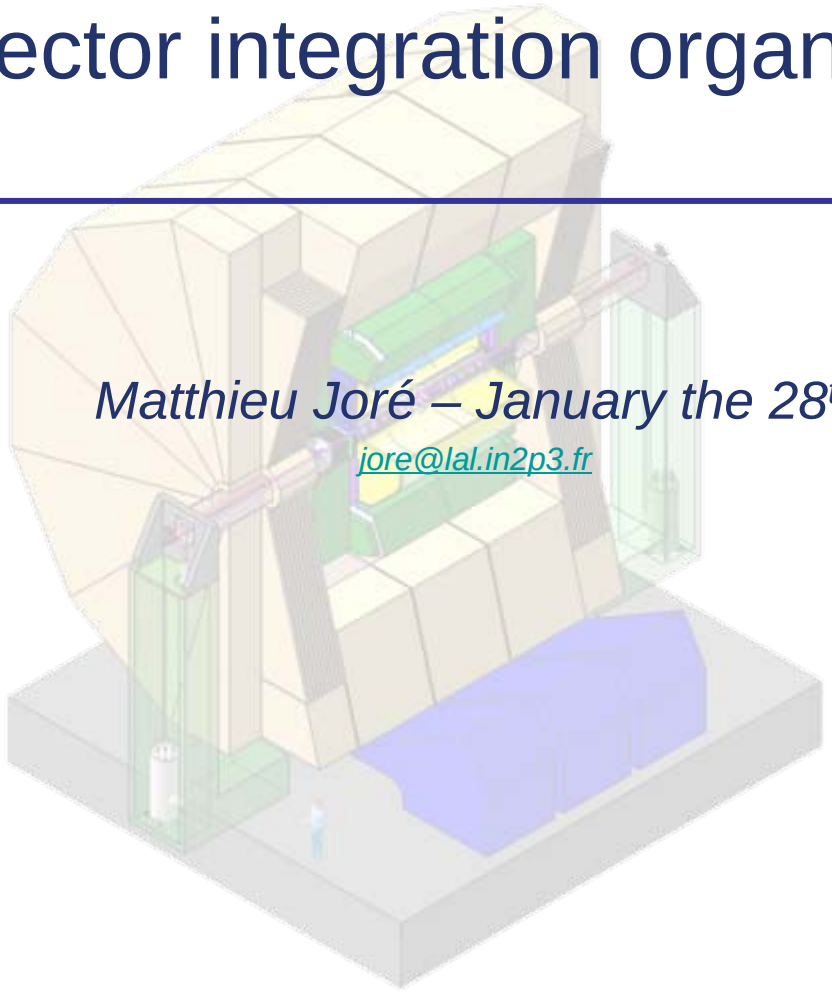
Detector integration organisation



Matthieu Joré – January the 28th

jore@lal.in2p3.fr

Outline

- Introduction :
  - **RD's recommendations**
  - **Interactions with the other ILD working groups**
  - **Motivations for a detector integration effort**
- Detector integration studies
  - **Present status and main priorities**
  - **Integration strategy**
  - **CAD management**
  - **Notion of Placeholders**
  - **Use of the ILC EDMS**
- Conclusions

RD's recommandations

- Continue R&Ds on critical components to demonstrate proof of principle
- Define a feasible baseline design (options may also be considered)

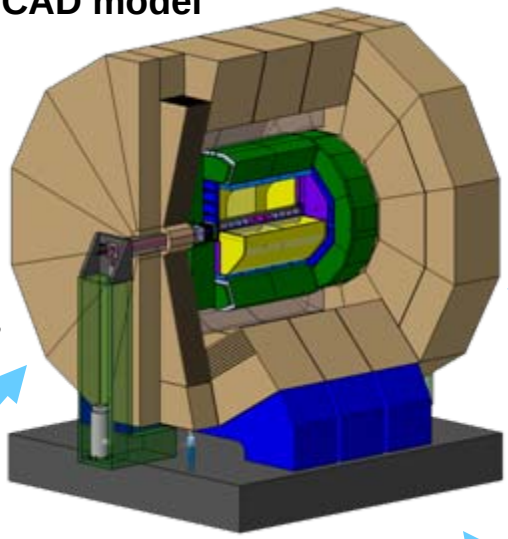
Charge of the detector integration team

- **Complete basic mechanical integration of the baseline design accounting for insensitive zones**

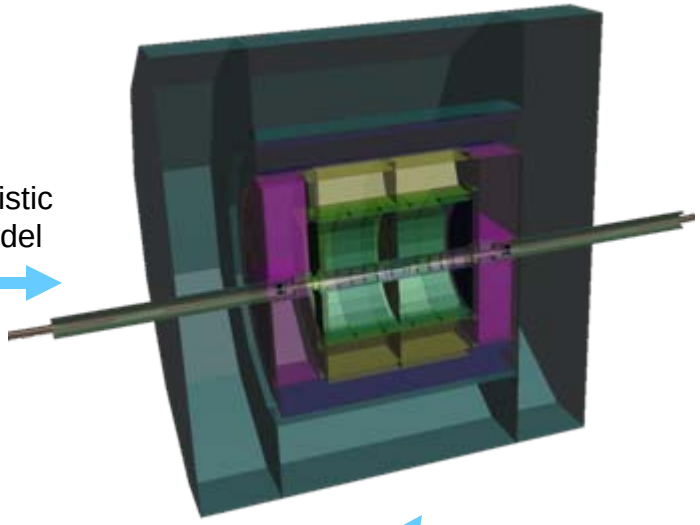
- Develop a realistic simulation model of the baseline design, including faults and limitations
- Develop a push-pull mechanism working with relevant groups
  - ***See Tauchi san's talk***
- Develop a realistic concept of integration with the accelerator including the IR design
- Simulate and analyse benchmark reactions, which can be updated
- Simulate and analyse some reactions at 1 TeV, including realistic higher energy backgrounds demonstrating the detector performance
- Develop an improved cost estimate.

Interaction with the ILD groups

ILD CAD model

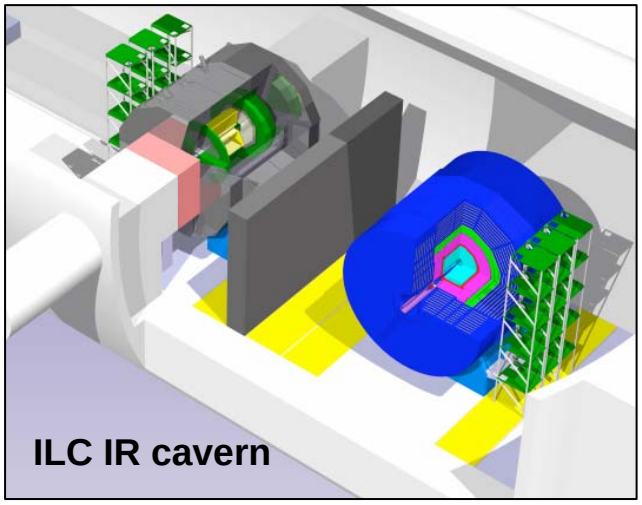


ILD simulation model



Develop a realistic simulation model

Integrate ILD in cavern, push-pull mechanism, services



Integrate support structure, services, etc..

Detailed description of sub detector model

Sub detectors models

Motivations for a detector integration effort

- CMS experience has taught us that we need to start integration as early as possible (start of integration before 1994)

- Realistic simulation model must be ready of end of 2010
  (result of soft pre meeting)

- Integration studies to be performed before :
  - ***Identification of insensitive zones such as the beam holes and gaps***
  - ***Design of support structure for each sub systems***
  - ***Integration of cables and services***

Present status & priorities

- Detector integration baseline has reached a good status in the LoI

BUT

- Some remaining studies need to be performed for end 2010 :
  - **TPC support**
  - **Inner detectors integration (VTX+silicon disks) including beam pipe**
    - First concept exists but a more detailed design is mandatory (who?)
  - **First integration of cables and services**
  - **Optimisation of the forward region including beam line components**

- Other points to be studied/optimised for DBD 2012:
  - **QD0 support**
  - **MONALISA integration (QD0 position monitoring)**
  - **HCal/ECal interface**
  - **…**

Integration strategy

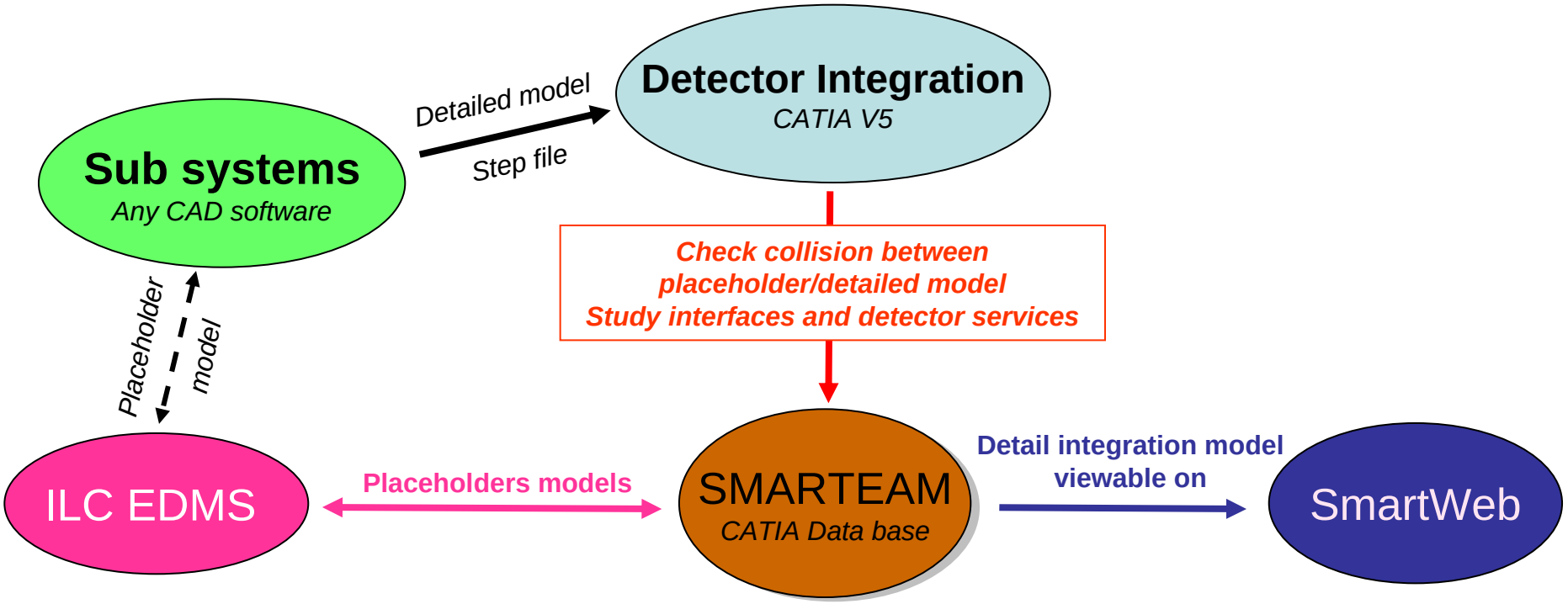
- Integration rules will be defined :
  - **For 3D model exchange (coordinates system, name, etc….)**
  - **For integration : adiabatic detectors (no heat exchange with its neighbours), …**
  - **No go boxes & placeholders for each sub system**
  - **Etc…**

- Information from sub detectors groups are mandatory :
  - **Technical contact to be identified**
  - **Services (cooling needed, cables, monitoring system)**
  - **Supporting method**
  - **Weight**
  - **Accuracy needed, alignment method**
  - **Etc….**

- C. Clerc is preparing a template document which would be filled by each sub detector groups *("Sub detectors interface parameters document")*
- These will be stored in the ILC EDMS

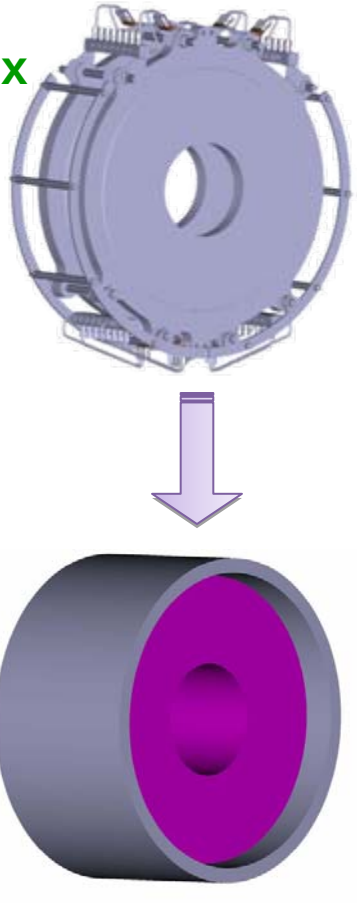
CAD management

- Slight changes from the previous CAD organisation :
  - **add a technical contact for each sub system**
  - **Add the use of the EDMS for engineering data storage and placeholders models**



Notion of placeholders

- Integration of sub systems with defining a placeholder (= integration box)
  - **Quicker to integrate in full model than detailed model (first level of integration)**
  - **Easy to check detailed model dimensions / allocated box**

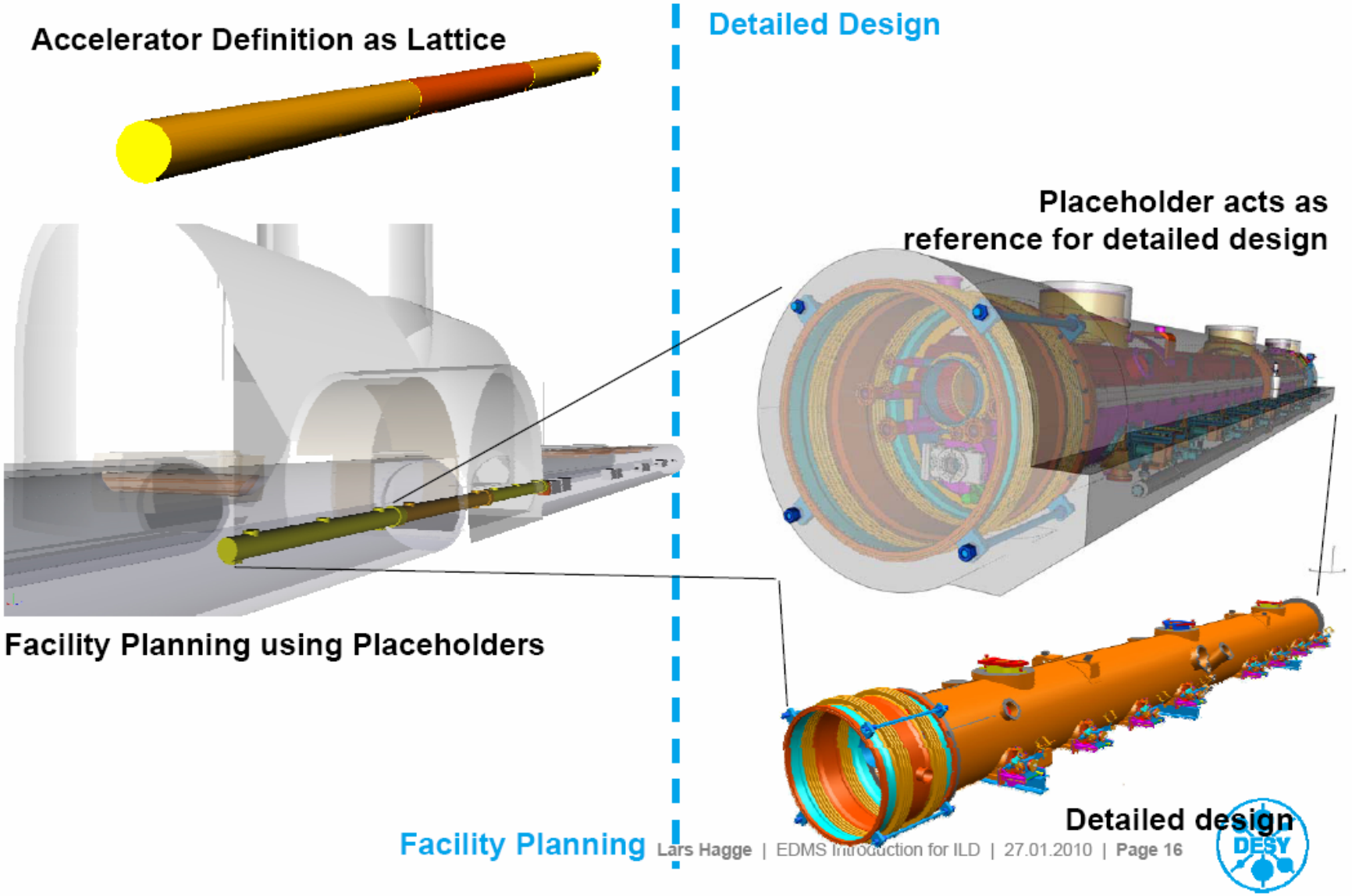


- Example of LumiCal :

Overall dimensions
+Gaps for fixing system
+Tolerances ; deformations
+Services : cables/cooling
+Room for mechanical alignment and for monitoring

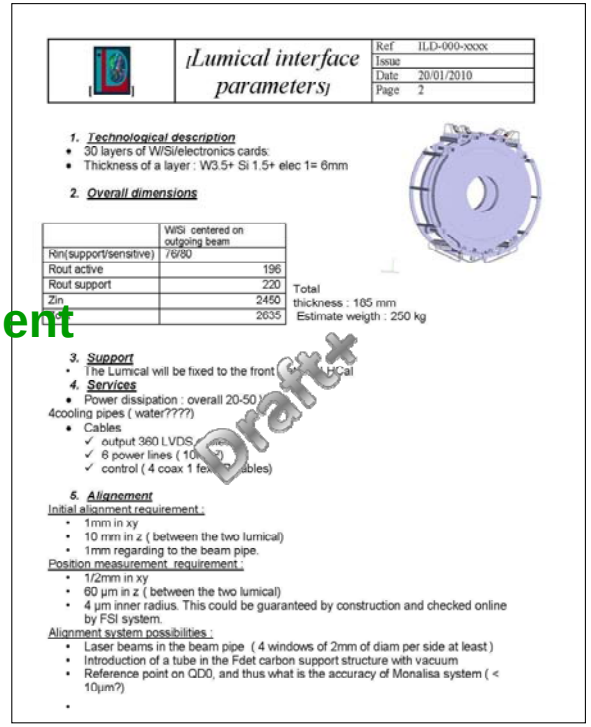
From C. Clerc presentation during MDI/Integration pre meeting

Example of XFEL tunnel design



Use of the ILC EDMS

- A GDE recommendation
- ILC EDMS system provides :
  - **Data storage system allowing technical data sharing in an international context**
  - **ILC is a long-term experiment: Product lifecycle management**
  - **Powerful drawings and 3D viewer**
- For ILD, this would be the place to share :
  - **Technical notes**
  - **Sub detectors interface parameters document**
  - **Drawings and placeholders model**
  - **FEM calculation results**
  - **…**
- Ease the work of integration



From C. Clerc presentation during MDI/Integration pre meeting

Conclusions

- Detector integration studies are mandatory for having :
  - **A basic and feasible mechanical integration of the baseline design**
  - **A realistic simulation model**

- Tools are available for performing this work :
  - **CAD management system**
  - **ILC EDMS**

- The detector integration group need :
  - **Information from sub detectors' group**
    - Sub detectors interface parameters document
  - **A technical contact named from each sub detector**
  - **To define integration rules and placeholders as early as possible**

Thanks for your attention.