

# Engineering tools for ILC detectors

Common task group « engineering tools » :  
C.Clerc (ILD),K.Krempetz ( SID) , A.Miccoli ( 4th)

## Detectors tools

- CAD
- Engineering analysis tools
- 3D Visualisation
- Documents sharing

Where and when to converge with accelerator

## CAD software

	Laboratories	CAD Software
ILD	· KEK, Tohoku Univ.	· Autodesk Inventor, Solid edge
	· DESY	· Ideas, Solid edge
	INP(Poland)	· Autodesk Inventor
	· IN2P3 ( LLR, LAL, LPSCS, LPNHE)	· CATIA V5
	· BNL	· Solid Edge
SID	· TRIUMF	· Solidworks
	· Argonne	· Autodesk Inventor, Solidworks
	· Fermilab	· Ideas, Autocad, Inventor, Solidworks
	· LAPP	· CATIA V5
4th	· SLAC	· Solid Edge, Autocad, Inventor
	· INFN Lecce	· Autodesk Inventor 2009, IDEAS 12

## Mechanical analysis ( FEM : Finite Element Models)

	Laboratories	Software
ILD	KEK, Tohoku Univ.	ANSYS
	DESY	Ideas & ANSYS, Opera 2D & 3D
	INP(Poland)	Autodesk Inventor
	IN2P3 (LLR, LAL, LPSC, LPNHE)	SAMCEF
	TRIUMF	ANSYS & COSMOS
SID	Argonne	ANSYS, SAP 2000
	Fermilab	Ideas, ANSYS
	LAPP	SAMCEF
	SLAC	ANSYS
4th	INFN Lecce	Ideas & ANSYS

## Stray Field and magnetic Forces

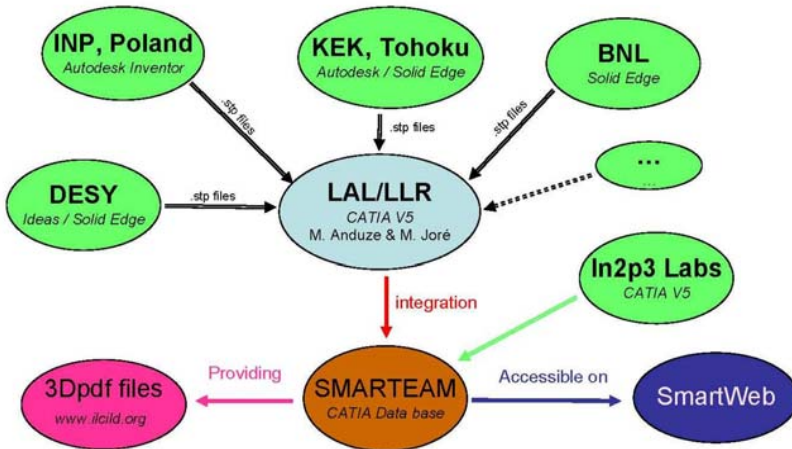
	Laboratories	Software
ILD	CEA	Opera ( vector field), Cast 3M ( a specific CEA code for strength simulations)
	DESY	CST EMStudio, ANSYS ( strength simulations)
	KEK	COMSOL, ANSYS
	TRIUMF	Opera
SID	All ( SLAC, Argonne, Fermilab)	ANSYS

- ✘ As many softwares as laboratories or institutes
- ✘ CAD interoperability through conversion to exchange file format ( .dxf, .step, .jt )

# 3D model & documents sharing

## ➤ ILD :

- ✓ Overall integration with Catia V5 via STEP files.
- ✓ 3D model in SMARTTEAM with Web interface SMARTWEB.
- ✓ Edition of a 3Dpdf file, updated regularly and store on ILCILD.org
- ✓ Some engineering documents on <http://www.ilcild.org/>



ilcILD.org

Home Users News Events Documents Groups

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New user?

Welcome to the ILD web site

ILD, the international large detector concept, is one of several detector concepts which are studied for the International Linear Collider. ILD is based on the LDC and the GLD detector concepts and was formed with the intention to cooperate in the preparation of the Letters of Intent, called for in October 2007 and to be completed in March 2009. The ILD detector concept is based on two fundamental assumptions that Particle flow will be used to reconstruct the complete event and that a very robust and redundant tracking system is needed to fully exploit the physics at the ILC. ILD proposes to combine a gaseous tracker, which gives a large number of true three dimensional points, with SI tracking devices to obtain a very powerful tracking system. Particle flow is made possible by a very fine grained calorimeter for both electromagnetic and hadronic showers.

- ILD documents and presentations
- ILD mailing lists
- ILD meetings
- ILD Working groups:
  - Detector optimization
  - Detector integration and machine-detector interface
  - Costing
  - Calorimeter
- Linear Collider Detector/Physics Workshops
- Links to related web sites
- How to use this web site
- ILD contact people and working group leaders

3D pdf file of ILD-00  
subdetectors

Send this — Print this —

# 3D model & documents sharing (2)

## ➤ SID : Sharing of the documents on ILCDOC

- ✓ « SID drawing section» : where to exchange drawings through conversion format.

One global design

- ✓ « SID Engineering database»: Engineering documents

Recherche Soumission Your account Aide

ilc international linear collider

Accueil

À PROPOS DE CE SITE  
Bienvenue sur le site du International Linear Collider (ILC) Document Server.

VOIR AUSSI  
ILC Agenda  
ILC-EDMS  
ILC Home Page

**ILC DOCUMENT SERVER**

CHERCHER DANS 18,470 NOTICES:

tous les champs

RECHERCHE LISTE

Conseils de recherche :: Recherche avancée

Limiter par collection:

- Documentation (1,003)  
Articles & Preprints (898) Publications & Notes (71) Internal Documents (34)
- Communication (262)  
Letters (1) Memos (2) Minutes (93) MOUs (2) Newsletters (193) Press Releases (11)
- Conferences & Meetings (17,056)  
Announcements (9) Talks & Contributions (14,852) Events (2,461)
- Engineering & Drawings (1)  
Drawings (1)
- Multimedia (130)  
Pictures (126) Video (1) Brochures (2) Posters (1)
- Test Area (18) [restreint]  
Test Documents (18)

Focaliser sur:

**Accelerator Design & Technology** (289)  
ILC General (289) ILC Beamline Areas (37) ILC Global Systems (14)  
ILC Technical Systems (21) SDE Organization (92) ILC Management (23)

**Physics & Detectors** (48)  
Physics & Detectors - General (25) Detector Concepts (16) Detector Components (23) Detector R&D (1) Detector Management (6) Physics Analysis & Software (6) Physics Theory (4)

**Other** (12)  
Test Beam Facilities (2) Software Tools (2) Laboratories, Institutes & Universities (7)

RECHERCHER ÉGALEMENT DANS:

- CERN Indico
- SPIRES HEP

ILC Document Server : Recherche Soumission Personnaliser Aide  
Powered by GDS\_Invenio v0.99.0.20090511  
Maintenu par ILCDoc Support Team  
Dernière mise à jour: 05 mai 2009, 05:53

Ce site est aussi disponible dans les langues suivantes:  
Català Deutsch Ελληνικά English Español Français Italiano 日本語  
Pycckий Українська 中文(簡) 中文(繁)

Recherche Soumission Your account Aide

ilc international linear collider

Accueil > Physics & Detectors > Detector Concepts > SID

**SID**

CHERCHER DANS 15 NOTICES:

tous les champs

Conse

Limiter par collection:

- SID General (9)
- SID Engineering (6) [restreint]
- SID Management (0)
- SID Tracking (4)
- SiD Calorimeter (3)
- SiD Magnet (0)
- SiD Installation (0)
- SiD Vertex (0)

RECHERCHER ÉGALEMENT DANS:

- CERN Indico
- SPIRES HEP

Recherche Soumission Your account Aide

ilc international linear collider

Accueil > Engineering & Drawings

**ENGINEERING & DRAWINGS**

CHERCHER DANS 1 NOTICES:

tous les champs

RECHERCHE LISTE

Conseils de recherche :: Recherche avancée

Limiter par collection:

- Drawings (1)  
SiD Drawings (1)

RECHERCHER ÉGALEMENT DANS:

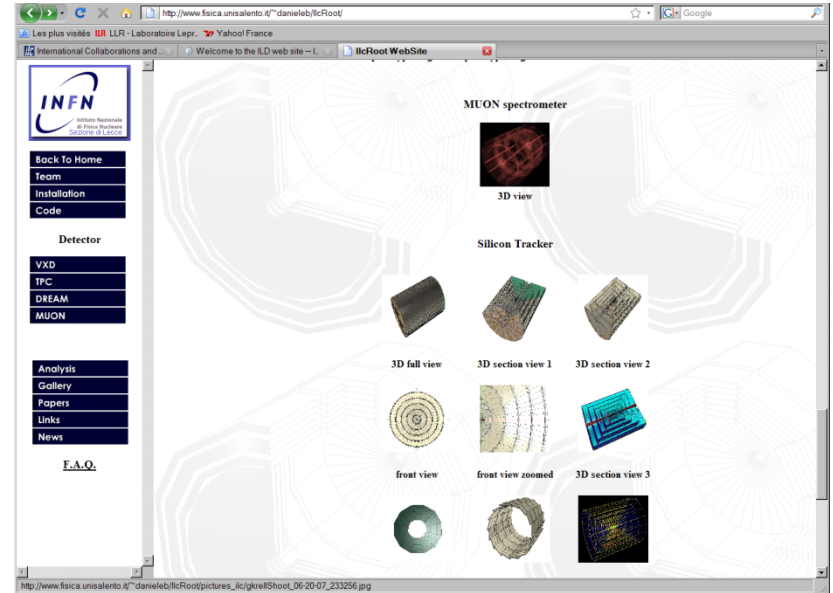
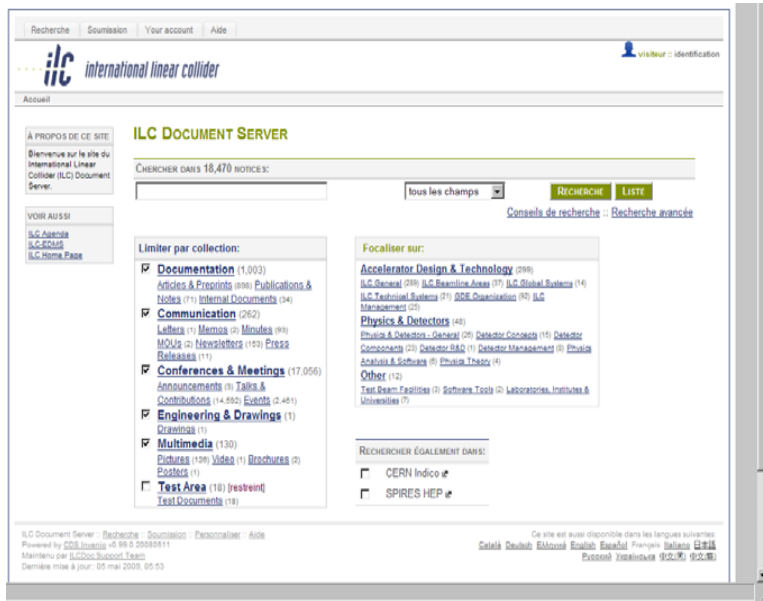
- CERN Indico
- SPIRES HEP

ILC Document Server : Recherche Soumission Personnaliser Aide

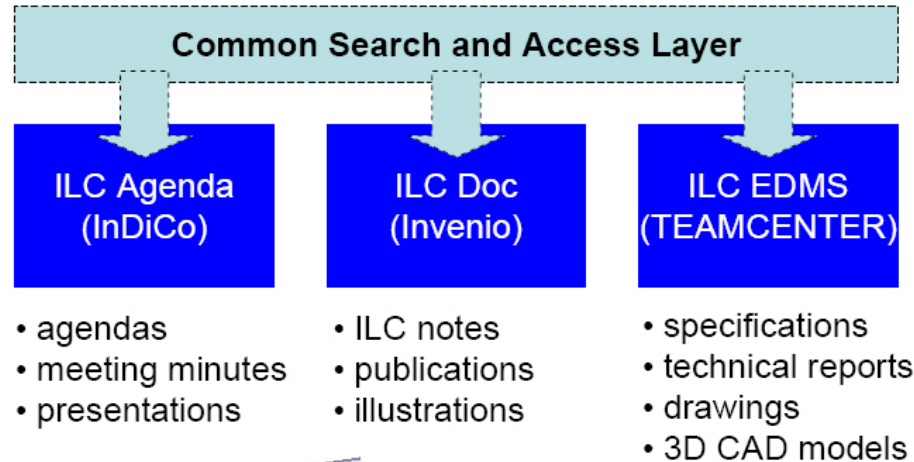
# 3D model & documents sharing (3)

## ➤ 4th :

- ✓ Technical view and documents on <http://www.fisica.unisalento.it/~danieleb/ILcRoot/>
- ✓ Some documents and images on ILCDOC



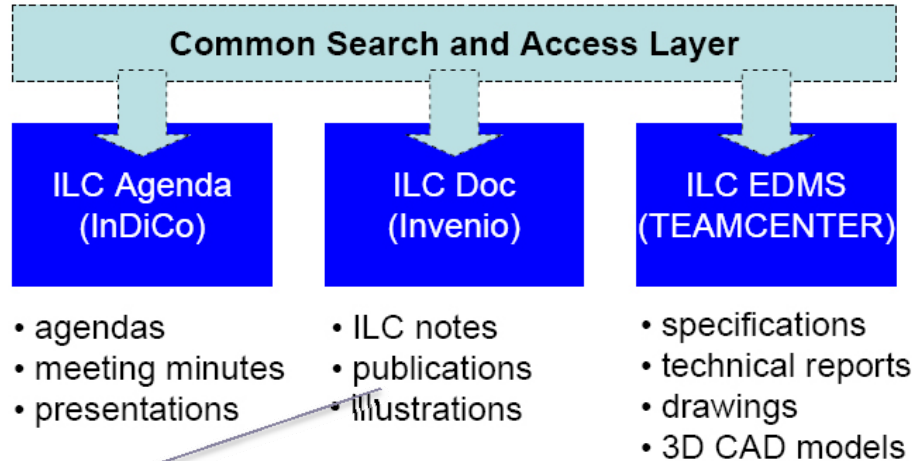
# GDE Recommendations



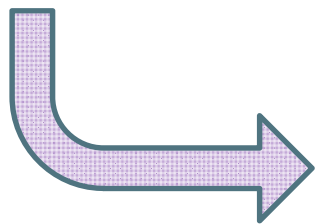
ILCDoc : “will mostly contain documents with textual or graphic information such as technical notes, communication, schedules, presentations, publications etc “

ILC-EDMS : “Documents containing engineering data such as drawings, technical specifications and cost estimates “

# GDE Recommendations



ILCDoc : Already used by detectors



Recherche Soumission Your account Aide

**ilc** international linear collider

Accueil > Physics & Detectors

### PHYSICS & DETECTORS

CHERCHER DANS 48 NOTICES:

tous les champs

RECHERCHER LISTE

Conseils de recherche : Recherche avancée

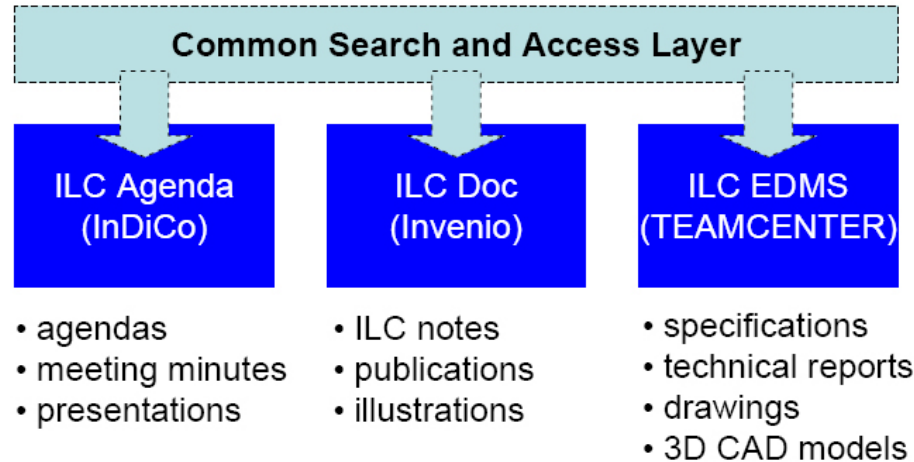
Limiter par collection:

- Physics & Detectors - General** (26)
- Detector Concepts** (15)
  - ILD (1) SID (15) 4th Concept (1)
- Detector Components** (23)
  - Detector Development - General (6) Tracking (6) Calorimetry (6) Detector Magnets (1) Vertex Detectors (1) Interface Machine Detector (5) Particle Identification (0) Detector Installation (0) Polarimetry (5)
- Detector R&D** (1)
  - Detector R&D General (1) R&D CALICE (0) R&D EUDET (0) R&D SILC (0) R&D TPC (0) R&D Vertex/Pixel (0)
- Detector Management** (3)
  - Detector Management - General (3) World Wide Study Organizing Committee (4) MDI Panel (1) Detector R&D Panel (0)
- Physics Analysis & Software** (6)
  - Software - General (1) Infrastructure (1) Simulation (4) Reconstruction (1)
- Physics Theory** (4)
  - Physics Theory General (4)

RECHERCHER ÉGALEMENT DANS:

- CERN Indico
- SPIRES HEP

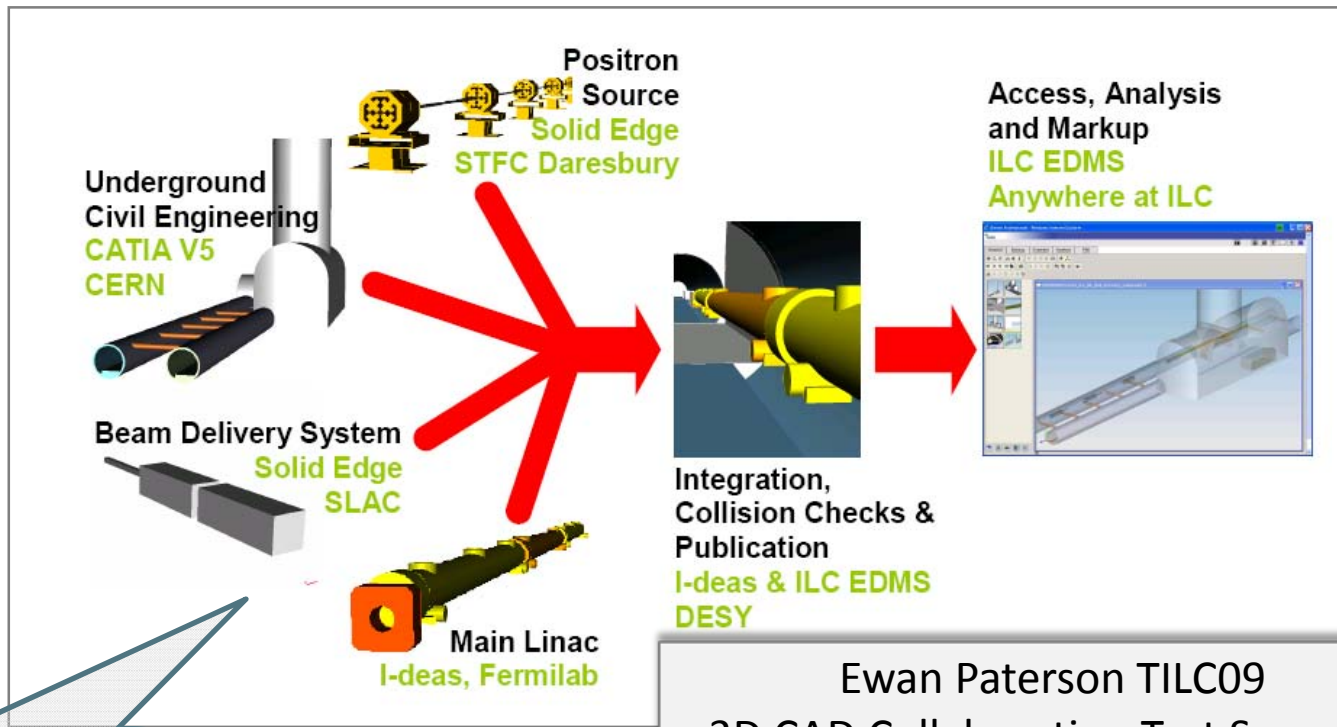
# GDE Recommendations



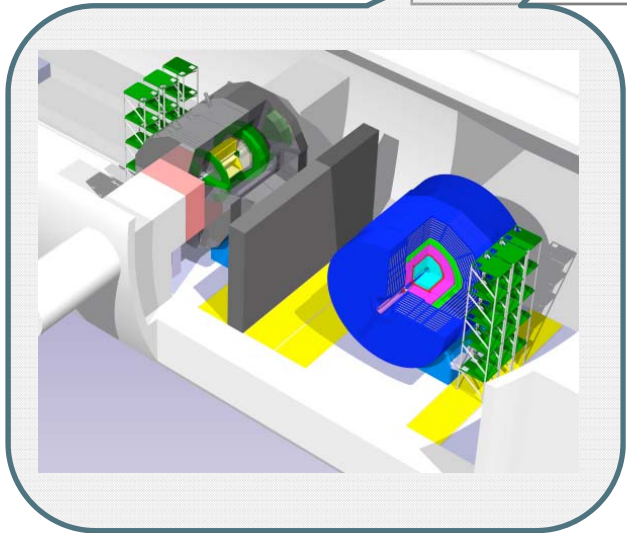
ILC-EDMS : “Documents containing engineering data such as drawings, technical specifications and cost estimates “

**Obviously the most « natural » tool & place where to store all engineering datas from detectors**





Ewan Paterson TILC09  
3D CAD Collaboration Test Scenario  
( Central Integration Work group)



***The detectors have to find their place.  
Thus to follow the same rules for integration,  
compatibility of our tools,  
PBS architecture,  
ILC Design Group instruction ( Coordinate System  
location and orientation)...***

## Exchange with BDS/MDI/ Civil engineering/Detectors

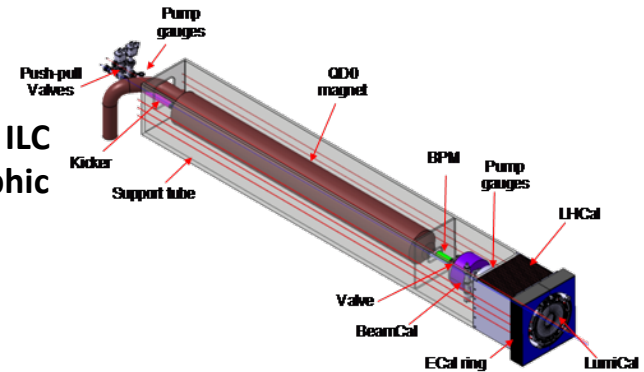
**BDS** : contacts with A. Seryi, N.Collomb, B.Parker

• Sent us ILC Design Group Instruction:

“Instructions for ensuring the 3D CAD models produced for the ILC Integration process follow the same procedure regardless of geographic locality and CAD system used. “ Including recommendations for

- Coordinate System location and orientation
- Simple Representations
- Naming Conventions

•Drawing exchanges with B.Parker 's group for QD0 as part of the detectors



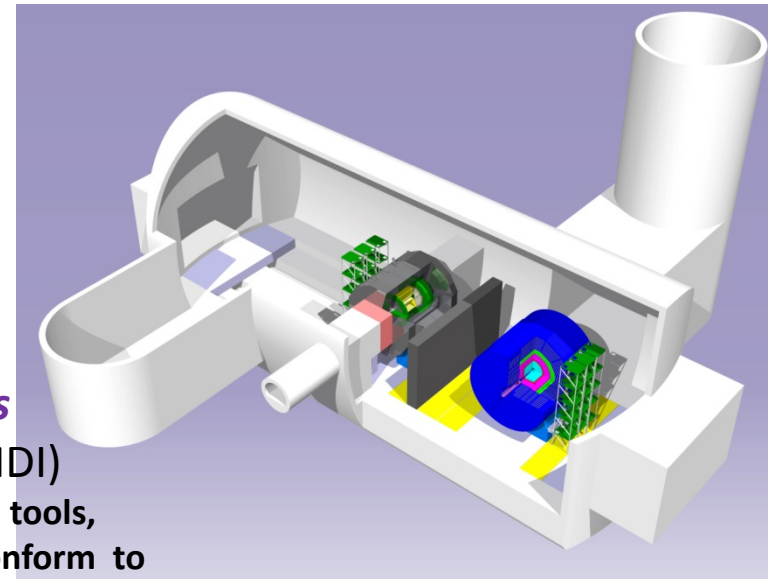
**Civil engineering ( IP ) /MDI(detectors):**

▪Engineers already work together for hall integration, push-pull considerations- CFS

**MDI+ Other detectors convenors for engineering tools**

K.Krempetz ( SID) , A.Miccoli ( 4th), M.Oriunno ( SID/MDI)

Each detector still working « on its side » and dealing with its own tools, but general feeling is that we should begin to organize ourself and conform to what exist on machine's side.



## **A lot to be done to integrate the ILC-EDMS :**

***Great need of management structures*** : the work of this « integration management group » should be to manage the declaration of items (PBS- BOM) and assemblies design datas ( documents and drawings)

- Define Team managers and form them to the use of ILC-EDMS
- Verify the compatibility of the existing tools with Teamcenter
- Define the documents and centralize them .
- For assemblies, CAD interoperability ( via JT » format for Teamcenter),
- 3D visualisation rather than 2D centric
- Prepare at least a first PBS structure, then the problem is the compatibility with the different detector solutions and existing R&D for each subdetector.

In fact, preliminary PBS structures already exist from cost estimation and/or 3D visualisation tools like Smarteam in case of ILD

***Learn from Accelerator side and exchange with its team***

**But** for most of the detector groups, it seems early because....

➡ Don't know what the future is made of : decision on the final detectors

➡ Manpower consuming....

➡ There is only one machine.... But there may be more than one detector and there are currently many options left in the different LOI.

The way to organize the PLM might be considered as directly relevant to the team that is going to be in charge of the assembly/construction/integration of the detector(s) on site.

Doesn't mean that we should not do the preliminary works .

**Time scale ?**

TDR phase 2 for accelerator ( 2012): what kind of document for the detectors , what level of engineering?