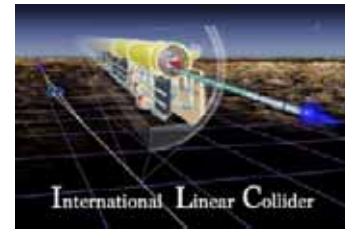


LHC Management Tools Application to ILC

J.P. Delahaye, J. Ferguson / CERN



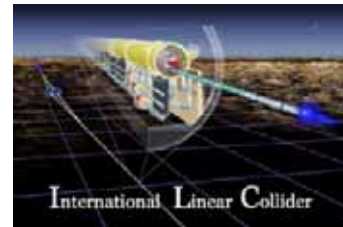
CERN Management Tools



- **Two areas of possible interest for ILC:**
- **Project management tools specially developed for LHC**
 - **Engineering Data Management System (EDMS),**
 - Equipment Manufacturing and Test Folder (MTF),
 - **Project Progress Tracking (PPT)**
 - **Earned value management (PPT/EVM)**
- **General management tools**
 - **CERN Document Server (CDS)**
 - **agenda/conference management (Indico),**
 - **Management Information System,**
 - Electronic Data Handling (EDH)
 - Personnel Data Base (Foundation)
 - CERN Expenditure Tracking (CET)



Equipment Data Management System (EDMS)

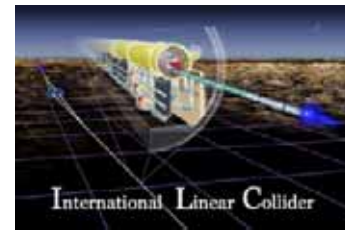


EDMS has been developed to manage the LHC project's engineering and equipment data over the project's lifetime covering the design, manufacturing, installation, operation and dismantling phases.

The following functions are provided :

- A full description of the components and the complete machine through their entire lifecycles are permanently available to all concerned**
- Provision of the tools to support and coordinate the globally distributed engineering work / information / data workflow**
- Distribution of “work in progress” documents asking for contributions or comments from well-defined list of experts before document finalization**
- Baseline Configuration Management by configuration change requests and approval by the configuration responsible following experts comments.**
- Facilities for tracing solutions to all problems occurring in the machine**
- asset tracking, configuration and maintenance management..

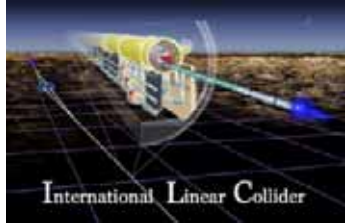
Engineering data management EDMS and Manufacturing and Test Folder (MTF)



- EDMS and MTF are Web applications developed at CERN providing Document and drawing management, management of structures and equipment data management. The system has 5500 users, contains 600000 documents and tracks 40000 pieces of equipment currently
- https://edms.cern.ch/file/587437/1/PLM_in_LHC_Project.ppt
- <https://edms.cern.ch/file/455890/1/SK-CEN250304.ppt>
- **EDMS Document and Drawing Management**
 - Document life-cycle with versioning and access control for each phase using a project dependent context
 - Distributed document approval process, comments collection and notification tools
- **EDMS Management of Structures (PBS,ABS)**
 - Project breakdown and assembly breakdown structures
 - Configuration management
- **MTF Equipment Data Management**
 - Manufacturing and installation workflow management
 - Non-conformance process management
 - Management of equipment properties and traceability of subcomponents



CERN EDMS - Architecture

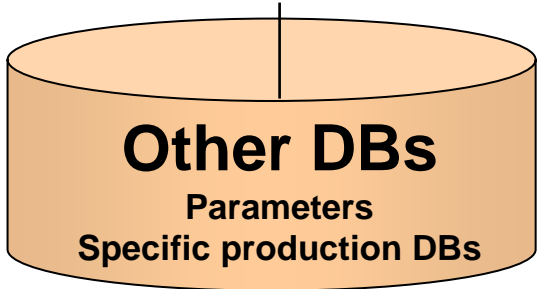
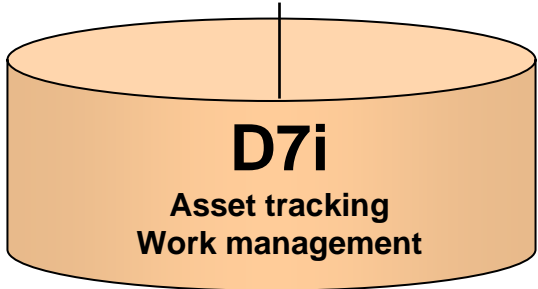
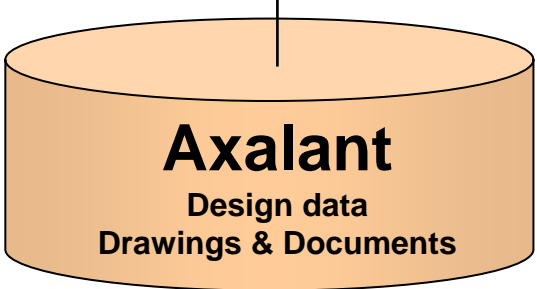


EDMS Web

MTF - Travellers

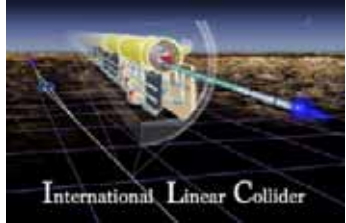


The CERN EDMS



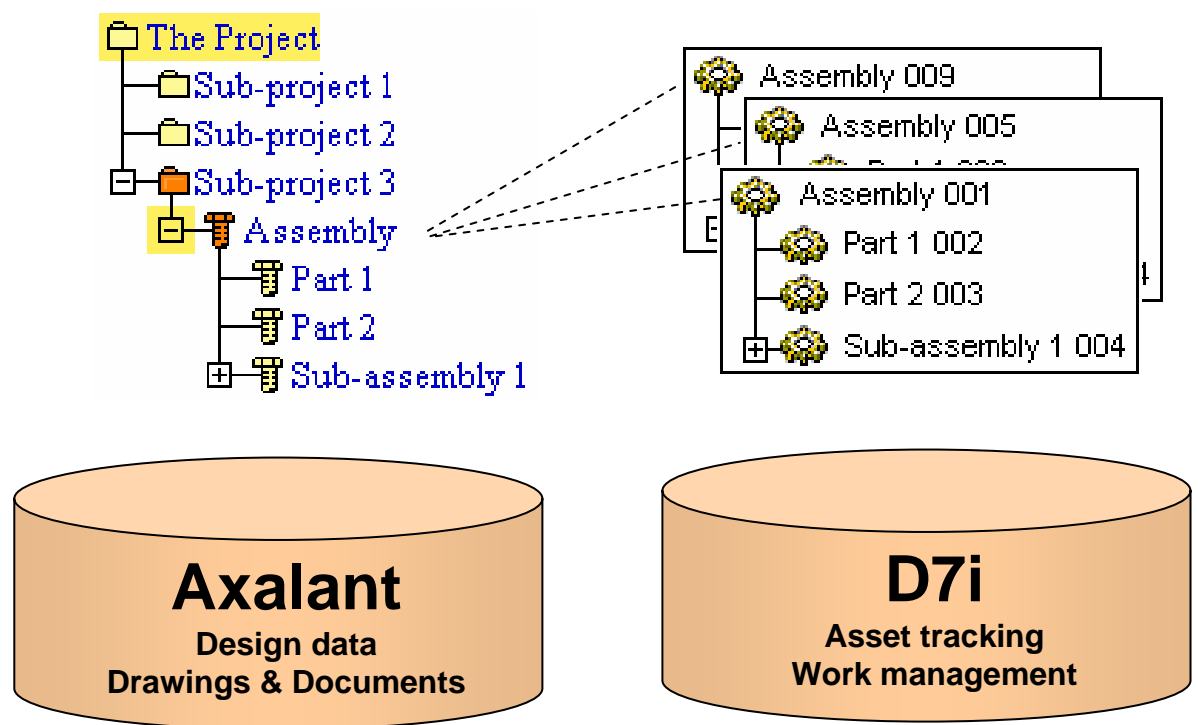


CERN EDMS - Architecture

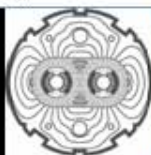


Document management & Design data

Asset tracking & Maintenance management



Axalant: an engineering data management tool from Agile Software Corporation.
D7i: an asset tracking and maintenance management system from DataStream Systems.



EDMS - Engineering Data Management System

EDMS # 455890

Managing

The dipole baseline design with configuration management

EDMS Web Navigator - Microsoft Internet Explorer provided by CERN

File Edit View Favorites Tools Help

Address https://edms.cern.ch/edms/blog/navigation.tree?cookie=21747955p_top_id=1504900006p_top_type=4p_top_id=1773042362p_top_type=4

LHC Hardware Baseline

Reset Set as Top Search Re-login DUKE

- Spool Pieces
 - Bus Bars
 - Dipole Bus Bars
 - Quadrupole Bus Bar Assem
 - Electrical Scheme for the J
 - Yoke & Related Components
 - Shrinking Cylinder & Related E
 - Quench Diode Assembly
 - Cold Bore Pipes & Insulation
 - Dipole Beam Screen
 - Heat Exchanger Tube
 - Cold Mass Instrumentation Eq
 - Supports for Auxiliary Busbar
 - Dipole Cryostat & Related Equipm
 - Standard Arc Short Straight Sections
 - Short Straight Sections in Dispersion
 - Other Arc Cryostats and Components
 - Long Straight Sections
 - Cryogenics
 - Vacuum System
 - DC Powering and Quench Protection
 - Radiofrequency System
 - Transfer Lines, Injections and Beam Dur
 - Other Machine Components

EDMS Spool Pieces

User: DUKE

Description:

Eq. Code: MC

EDMS Id: LHCAM085 v.0

Responsible: Rob WOLF

Documents in this node: 2

Displayed	Sorted by
Compact listing	Default
Extended listing	Number
Hide obsolete	Creation Date
Show obsolete	Status

LHC-MC-CI-0002 v.4.0 Technical Specification for the supply of enamelled superconducting wire for the LHC corrector magnets Released

[Doc page](#) [it2649description.pdf](#) (71 kb) [it2649addendum.pdf](#) (21 kb)

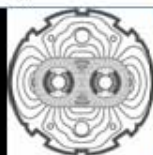
LHC-MC-EC-0001 v.1.1 Parameters Changes in Corrector Magnets Accepted

[Doc page](#) [lhc-mc-ec-0001-10-10.doc](#) (84 kb) [PDF](#) (189 kb)

EDMS CERN

EDMS 3.7 ©CERN - 2003.10.21 - 14:34:34





EDMS - Engineering Data Management System

EDMS # 455890

Managing

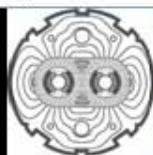
The dipole baseline design with configuration management

Document life-cycle with versioning and access control for each phase using a project dependent context



The screenshot shows the EDMS Document Information Page for document LHC-MCDO-EC-0001. The page is titled "EDMS Document Information Page" and shows the user "DUKE". The document is titled "Modified Acceptance Criteria for the Position and Alignment of the Magnetic Axis with Respect to The Mounting Flange of MCDO Correctors (Spool Pieces)" and is in the "Accepted" state. The document is associated with an Engineering Change Request (ECR) dated 2002-09-11. The page also shows a list of versions of the document, with the current version being LHC-MCDO-EC-0001 v.1.0. The page includes tabs for Summary, Sub-Documents, Approval & Comments, Used in, Access Rights, and Versions & other info. The current view is "Versions & other info", which shows a table of document versions. The table has columns for document number, title, and status. The current version is highlighted in green and marked as "Accepted".

Document Number	Title	Status
LHC-MCDO-EC-0001 v.1.0	Modified Acceptance Criteria for the Position and Alignment of the Magnetic Axis with Respect to The Mounting Flange of MCDO Correctors (Spool Pieces)	Accepted
LHC-MCDO-EC-0001 v.0.1	Modified Acceptance Criteria for the Position and Alignment of the Magnetic Axis with Respect to The Mounting Flange of MCDO Correctors (Spool Pieces)	Obsolete



EDMS - Engineering Data Management System

EDMS # 455890

Managing

The dipole baseline design with configuration management

Document life-cycle with versioning and access control for each phase using a project dependent context

Collecting comments on technical specifications

Address https://edms.cern.ch/coda/jsd/doc/info?cookie=C1002126document_id=040251&version=0.116_tab=7483

Created by LHC Baseline ADMINISTRATOR on 2002-06-19, 14:08

Status changed to Under Approval by LHC Baseline ADMINISTRATOR on 2002-06-19, 15:22

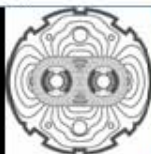
Approval started by LHC Baseline ADMINISTRATOR on 2002-06-19, 15:22 using LHC-Test Area Working Group distribution list

Given Comments (5 records) [Hide](#)

Normal display	Text display	Show all pages	Hide all pages	Sort: Date	Reviewer	Page	Action
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Thierry RENAGLIA on 2002-06-20, 08:47 said:		Seen <input type="checkbox"/>
					vu		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Michel GENET on 2002-06-21, 14:37 said:		Accept <input checked="" type="checkbox"/>
					no comment		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Louis WALCKIERS on 2002-06-24, 18:02 said:		Seen <input type="checkbox"/>
					No Comment		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lucio ROSSI on 2002-07-01, 18:00 said:		Accept <input checked="" type="checkbox"/>
					We take note of the proposal. The only concerns is that this is eating room to allow in future larger tolerances on the positioning of the frame of correctors within +/- 0.3 mm wrt to the V1 V2 references. Indeed, as said in many circumstances, we are going to review the tolerance according to actual results, after 3X10 CM build by Industry. The here new proposed tolerances of MCDO will add up to the tolerance of assembly by CMs.		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Paul FAUGERAS on 2002-07-02, 17:11 said:		Seen <input type="checkbox"/>
					Why not grouping this ECR with the next one, which deals with magnetic quality and acceptance of the MCDO?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Jean-Pierre QUESNEL on 2002-07-05, 10:51 said:		Seen <input type="checkbox"/>
					En page 4, vous acceptez des défauts de 0.3mm pour autant que la valeur r.m.s. soit de 0.1 ou mieux. le calcul du r.m.s. devrait se faire sur plus que 50 éléments. De plus, ces éléments retenus devraient au moins être pris au hasard sur l'ensemble de la production. vous ne pouvez accepter que 1% de la production ayant des défauts de 0.3mm.		

Notified Persons (27 records) [Show](#)





EDMS - Engineering Data Management System

EDMS # 455890

Managing

The dipole baseline design with configuration management

Document life-cycle with versioning and access control for each phase using a project dependent context

Collecting comments on technical specifications or on drawings

LHC Hardware Baseline

Reset Set as Top Search Re-login

DUKE

- Survey Reference System
- Fastening Devices for Trans
- Auxiliary Busbar Tube Assent
- Tube for Line N in Dipole
- Flexible Hose in Dipole
- Standard Arc Short Straight Sections
- Short Straight Sections in Dispersion
- Other Arc Cryostats and Components
- Long Straight Sections
- Cryogenics
- Vacuum System
- DC Powering and Quench Protection
- Radiofrequency System
- Transfer Lines, Injections and Beam Dump
- Other Machine Systems
- Civil Engineering Works and Infrastructure
- General Services
- Installation
- Schelding
- LHC Specific Facilities

Folder Contents

LHC-QBA-CI-0013 DRAWING FOLDER
Drawings related to IT-2027/LHC/LHC - LHC Cryodipole Transport End Restraints

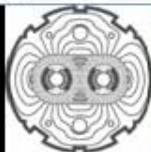
LHCQBA S0050	LHC DIPOLE CRYOSTAT - SERIES - TRANSPORT RESTRAINT RING
LHCQBA S0051	LHC DIPOLE CRYOSTAT - SERIES - TRANSPORT RESTRAINT END PLATE

PLOT FOLDER
You are not allowed to plot, sorry

cdlguest

CDD WEB 1.2e: [Support Team](#) - [Information](#) - [HELP](#) - [Terms/Conditions](#)

This page was produced by the Oracle Web Agent on October 21, 2003 17:30



EDMS - Engineering Data Management System

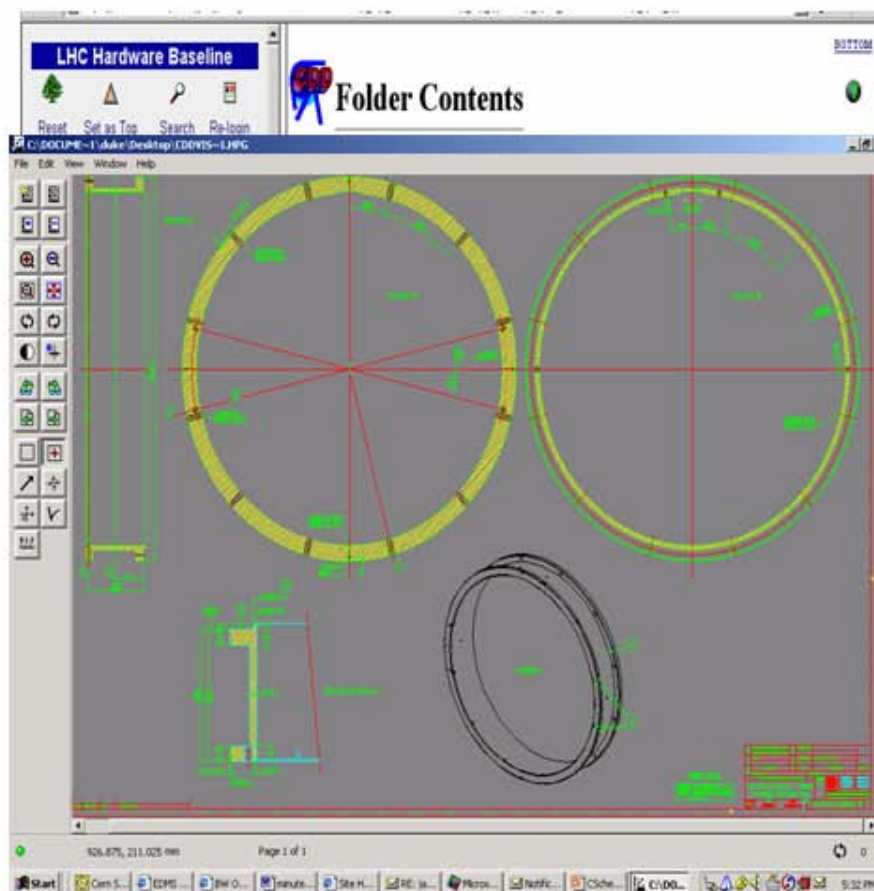
EDMS # 455890

Managing

The dipole baseline design with configuration management

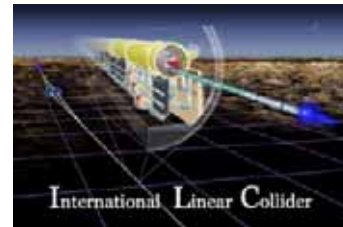
Document life-cycle with versioning and access control for each phase using a project dependent context

Collecting comments on technical specifications or on drawings



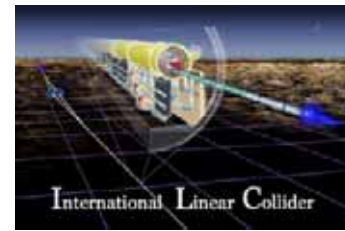


Project Progress Tracking (PPT)



- First developed as a milestone tracking and progress reporting system for the Atlas Detector construction project (PPT)
- Subsequently developed into a comprehensive Earned Value Management system for the LHC (EVM)
- Further evolved for laboratory long term resource planning (personnel and materials) (APT)

Project Progress Tracking & Earned Value Management (EVM)



LHC

- 3.3 BCHF expenditure
- 12 years

ATLAS Detector

- 500 MCHF CORE Cost,
- 150 institutes in 35 countries

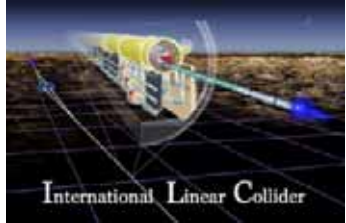
CNGS

- 75 MCHF expenditure
- CERN & Gran Sasso

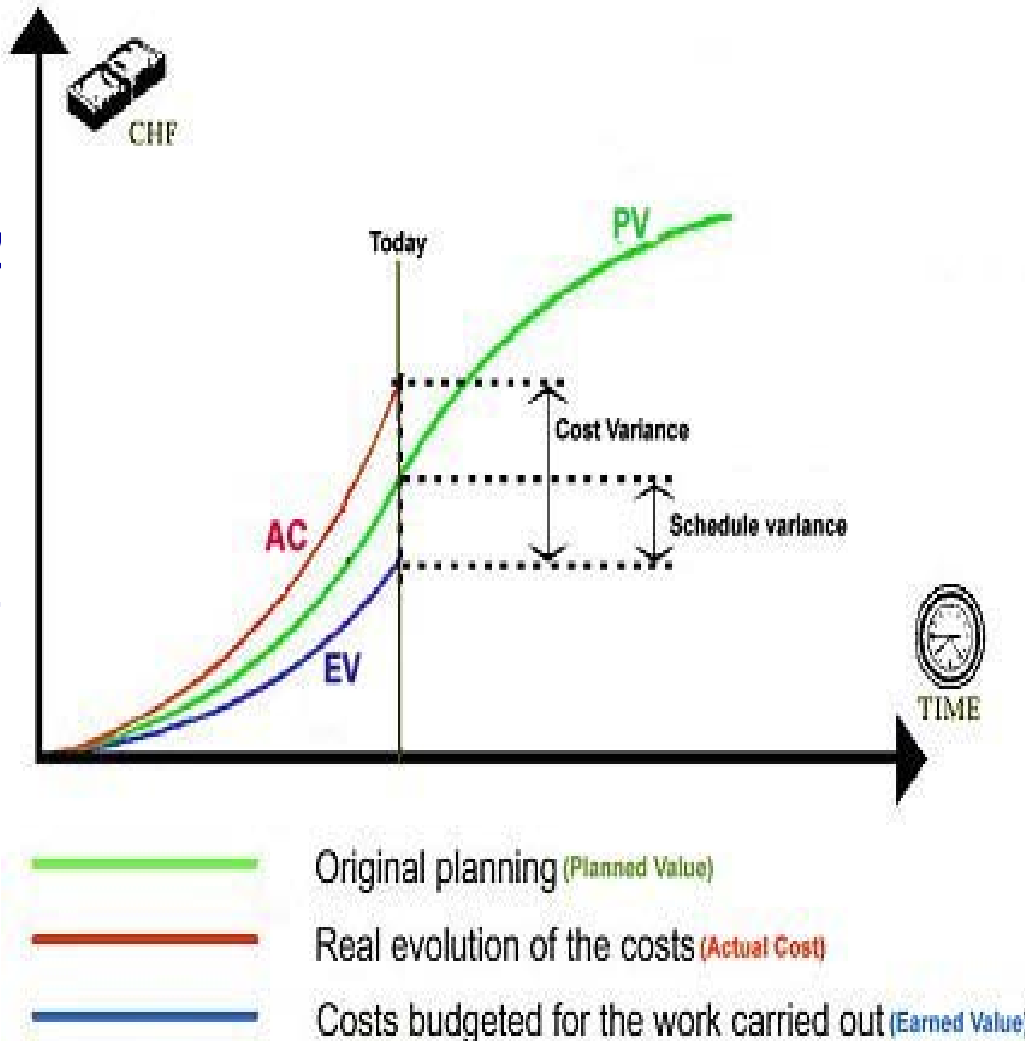
- **Work Breakdown Structure (WBS) in Work-Units or Tasks with time-scale, deliverables & resources and one responsible.**
- **Central repository of tasks & milestones organized around WBS**
- **Direct links/synchronisation to contracts & accounting system**
- **Cash-flow predictions**
- **Automatic request by e-mail to each Work-Unit responsible for progress reporting with deadline**
- **Uniform progress reports available on the WWW for management follow up at all levels (minimize overhead for progress reporting)**
- **Project control using Earned Value at all levels of the project**
- **Comparison of the status of the overall project and of each task (resources and schedule) with original planning**
- **Automatic alerts triggered on budget or schedule**
- **Help: http://ais.web.cern.ch/ais/apps/ppt/lhc/online_help.html**



EVM Concepts

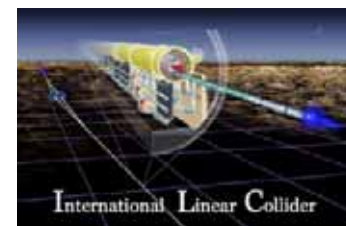


- WBS: hierarchical list of all the activities to be performed to complete the project.
- Workunits: Activity small in size/duration, under responsibility of one person (+11000 workunits for LHC)
- Workunits use Resources to produce Deliverables
- Planned Value (PV): budgeted cos of work scheduled
- Earned Value (EV): budgeted cost of the work that has been performed
- Actual Cost (AC): real cost of the work performed





PPT/EVM for LHC: Summaries































































PPT EVM
CERN - European Organization for Nuclear Research

News Workunits Staff Plan CashFlow **EVM Summaries** Metrics Activity Log

LHC Project User: Jurgen DE JONGHE Help Any problems? Contact our Support Logout

Display: Organisation (by BC) Budget Codes: Approved ☒ LHC (PROJ) ☒ IES ☒ ICO ☐ SC ☐ Other

Recalculate

Organisation (by BC)	From Project Start to Date					Total PV Trend	CTC LHC + IES + ICO	Delta CTC
	PV Trend	EV	AC	Variance				
				Schedule	Cost			
 CERN  	2`269`731`652	2`187`366`837	2`194`636`849	-82`364`815	-7`270`012	3`013`095`476	2`964`690`697	-48`404`779
 AB  	151`001`846	141`510`219	135`877`278	-9`491`627	5`632`941	275`238`628	276`367`711	1`129`083
 AT  	1`396`135`548	1`337`127`346	1`339`282`117	-59`008`202	-2`154`771	1`906`616`411	1`866`510`183	-40`106`228
 IT  	7`022`927	6`506`735	5`911`224	-516`192	595`511	10`171`192	10`171`771	579
 LHC  	14`118`306	13`787`476	13`392`666	-330`830	394`810	29`916`697	27`180`718	-2`735`979
 PH  								
 SC  	396`321	334`850	152`902	-61`471	181`948	694`932	1`259`952	565`020
 TS  	701`056`702	688`100`211	700`020`661	-12`956`491	-11`920`450	790`457`616	783`200`362	-7`257`254
 EST-ISS  	374`462	374`462	433`392		-58`930	374`462	418`000	43`538
 EST-ME  	5`797`545	5`749`285	5`736`903	-48`260	12`382	5`806`302	5`739`995	-66`307
 TS-CE  	466`463`567	467`620`960	480`736`888	1`157`393	-13`115`928	470`224`624	465`720`651	-4`503`973
 TS-CSE  	9`581`397	8`147`660	8`319`235	-1`433`737	-171`575	24`359`961	28`698`383	4`338`422
 TS-CV  	98`169`523	95`736`156	90`886`500	-2`433`367	4`849`656	125`937`093	125`505`185	-431`908
 TS-EL  	53`493`002	50`187`896	55`835`780	-3`305`106	-5`647`884	63`710`614	62`440`808	-1`269`806
 TS-FM  	300`399	423`170	270`141	122`771	153`029	771`506	738`019	-33`487
 TS-IC  	38`453`896	33`646`332	32`855`953	-4`807`564	790`379	53`348`398	48`471`610	-4`876`788
 TS-LEA  	14`336`897	13`442`174	12`462`183	-894`723	979`991	19`466`115	18`956`238	-509`877
 TS-MME  	5`101`898	4`861`408	4`679`253	-240`490	182`155	5`298`109	5`293`259	-4`850
 TS-SU  	8`984`116	7`910`708	7`804`432	-1`073`408	106`276	21`160`432	21`218`214	57`782
 Other  								

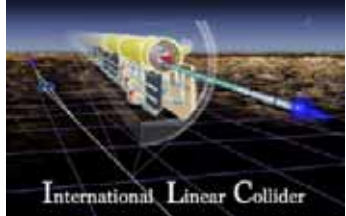
Data was updated at 15:29 on 31-JAN-2005



August 2005
ILC Snowmass WS



PPT/EVM for LHC: Summaries



Show Actual Costs for:

Organization Unit Budget Code

Contract Amount >

Payments since

Include Budgetcodes:

☒ LHC (PROJ) ☒ IES ☒ ICO ☐ Other

Ordered by:

AC Date Amount

Show Payments

Staff Plan CashFlow EVM Summaries Metrics Activity Log

urgun DE JONGHE Help Any problems? Contact our Support Logout

☒ LHC (PROJ) ☒ IES ☒ ICO ☐ SC ☐ Other

Recalculate

Org	AC Date	Organization Unit	Budget Code	Order	Description	Invoice	Amount
	26-Jan-2005	TS-CE	96704	CK1000209	Package 3 - Adjudicator for CE contracts (9901-9912)	153943	1`088
	26-Jan-2005	TS-CE	96704	CK1000212	Package 3 - Adjudicator for CE contracts (9901-9912)	2453943	1`088
	26-Jan-2005	TS-CE	96739	CK1000237	Package 3 (TI8) Adjudicator CE contract (9901-9912)	153943	1`088
	26-Jan-2005	TS-CE	96739	CK1000240	Package 3 (TI8) Adjudicator CE contract (9901-9912)	2453943	1`088
	25-Jan-2005	TS-CE	96727	OV500261	Civil engin. construction Pack.2 (0501-)	2500907	864`002
	25-Jan-2005	TS-CE	96727	OV503025	Supplemental agreement (0501-)	2500001	609`000
	25-Jan-2005	TS-CE	96727	OV500881	Civil eng. construction Pack 2 (0501-)	100907	352`346
	25-Jan-2005	TS-CE	96727	OV503027	Supplemental agreement (0501-)	200001	248`355
	25-Jan-2005	TS-CE	96726	OV500261	Civil engin. construction Pack.2 (0501-)	2500907	129`104
	25-Jan-2005	TS-CE	96727	FR106	revision de prix (0401-)	2500907	93`654
	25-Jan-2005	TS-CE	96726	OV503025	Supplemental agreement (0501-)	2500001	91`000
	25-Jan-2005	TS-CE	96726	OV500881	Civil eng. construction Pack 2 (0501-)	100907	52`649

ICO	Delta CTC
0`697	-48`404`779
7`711	1`129`083
0`183	-40`106`228
1`771	579
0`718	-2`735`979
9`952	565`020
0`362	-7`257`254
8`000	43`538
9`995	-66`307
0`651	-4`503`973
8`383	4`338`422
5`185	-431`908
0`808	-1`269`806
8`019	-33`487
1`610	-4`876`788
56`238	-509`877
3`259	-4`850
8`214	57`782

- TS
- EST-ISS
- EST-ME
- TS-CE
- TS-CSE
- TS-CV
- TS-EL
- TS-FM
- TS-IC
- TS-LEA
- TS-MME
- TS-SU
- Other

Date	Type	User	PV Trend to Date	EV	AC	Total PV Trend	View	Comments
14-Jan-2005		L. Lopez-Hernandez (TS-CE)	Amount: 465`720`895 Change: -74`999	Amount: 467`620`960 Change: 1`406`056	478`146`703	470`224`624	view	update
07-Jan-2005		B. Pirollet (TS-CV)	Amount: 465`452`588 Change: -3`250	Amount: 466`134`904 Change: 0	478`130`347	470`224`624	view	
14-Dec-2004		S. Pizzera (LHC-RC)	Amount: 464`618`708 Change: -1`300	Amount: 466`134`904 Change: -1`300	473`858`251	470`224`624	view	Upload to update amend.10
14-Dec-2004		S. Prodon (TS-IC)	Amount: 464`620`008 Change: 101`400	Amount: 466`134`904 Change: 101`400	473`858`251	470`225`924	view	amend.10

cmd	WU	WU ID	Type	Status	Description	WBS	PBS	Holders	E-Mail	Actual/Expected Start	Actual/Expected Finish	Comments
cmd L1	WU ID #	Job Type	Staff Email			Budget Code	Duration	Unit (M/WK, %)				Comments
cmd L2	WU ID #	Job Type	Description			Budget Code	Cashflow	PV	CHF			Comments
cmd L3	WU ID #	Job Type	Description			Budget Code	Cashflow	PV	CHF	Duration	Unit (M/WK, %)	Comments
cmd Other	WU ID #		Expense description			Budget Code	Cashflow	PV	CHF			Comments
cmd DE	WU ID #	Weight	Deliverable description			Equip. Type	Actual Qty	Total Qty	Unit		Actual/Expected Finish	Comments
m	wu	33047	1	CO (100%)	Platines pour overhead travelling crane PR780 cavern USC55	LHC.17.3			SYLVIE.PRODON@CERN.CH	04-AUG-2004	30-SEP-2004	
m	M1	33047	1		F280,avenant 10	96411	100100	100100	CHF			
de		33047	1	1	Platines pour overhead travelling crane PR780 cavern USC55 done	None	1	1	U		30-SEP-2004	

Cost Impact:

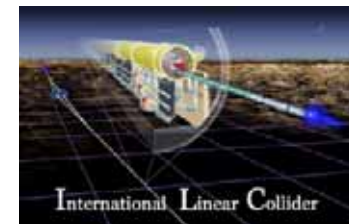
- budgetcode 96411: cost reduction 1`300 CHF

Schedule Impact:

- No impact



PPT/EVM for LHC: Summaries



Display: Orga

Organisation

- CERN
- AB
- AT
- IT
- LHC
- PH
- SC
- TS
- EST-ISS
- EST-ME
- TS-CE
- TS-CSE
- TS-CV
- TS-EL
- TS-FM
- TS-IC
- TS-LEA
- TS-MME
- TS-SU
- Other

Show Actual Costs

Organization Unit:

Contract:

Payments since: 30

Include Budgetcode

☒ LHC (PROJ) ☒ IES

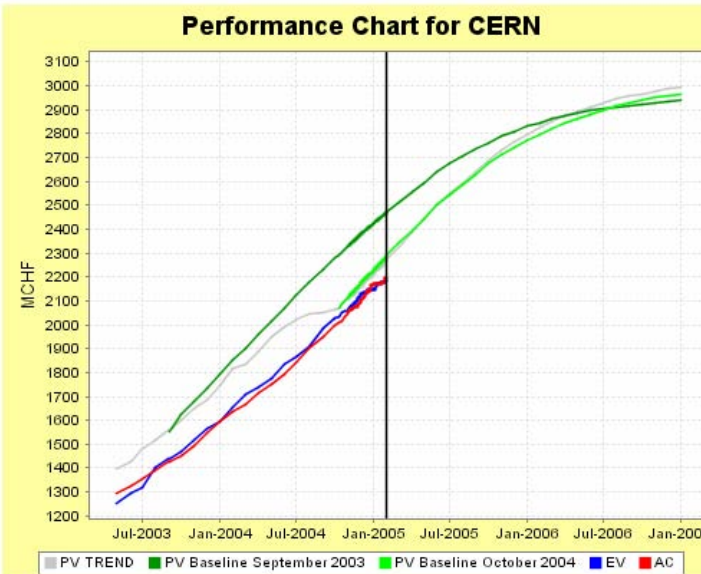
Ordered by:

AC Date

Show Performance

Start Date: 16-Apr-2003 End Date: 31-Jan-2007

☒ Show Baseline September 2003 ☐ Show EV Provision



cmd	WU	WU ID	Type	Grade	Description	Budget Code	PV	Cashflow	PV	CHF	Duration	Unit (M/WK, %)	Comments	
cmd L1	WU ID #		Job Type		Staff Email	Budget Code	Cashflow	PV	CHF				Comments	
cmd L2	WU ID #		Job Type		Description	Budget Code	Cashflow	PV	CHF				Comments	
cmd L3	WU ID #		Job Type		Description	Budget Code	Cashflow	PV	CHF		Duration	Unit (M/WK, %)	Comments	
cmd Other	WU ID #				Expense description	Budget Code	Cashflow	PV	CHF				Comments	
cmd DE	WU ID #		Weight		Deliverable description	Equip. Type	Actual Qty	Total Qty	Unit				Actual/Expected Finish Baseline Plan Finish	
m	wu	33047	1		CO (100%) Platines pour overhead travelling crane PR780 cavern USC55	LHC.17.3				SYLVIE.PRODON@CERN.CH			04-AUG-2004	30-SEP-2004
m	M1	33047	1		F280,avenant 10	96411	100100	100100	CHF					
de		33047	1	1	Platines pour overhead travelling crane PR780 cavern USC55 done	None	1	1	U				30-SEP-2004	

Cost Impact:

- budgetcode 96411: cost reduction 1'300 CHF

Schedule Impact:

- No impact

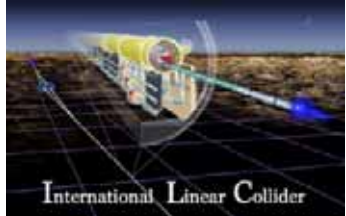
Staff Plan **CashFlow** **EVM Summaries** **Metrics** **Activity Log**

rgen DE JONGHE [Help](#) [Any problems? Contact our Support](#) [Logout](#)

☒ LHC (PROJ) ☒ IES ☒ ICO ☐ SC ☐ Other

Transactions: 1 - 6 out of 6. Page size: 50

AC	Total PV Trend	View	Comments	ICO	Delta CTC
Amount	Change	Excel	Web		
478'146'703'470'224'624	0	view	view	0'697	-48'404'779
478'130'347	470'224'624	0	view	7'711	1'129'083
473'858'251	470'224'624	-1'300	view	0'183	-40'106'228
473'858'251	470'225'924	101'400	view	1'771	579
				0'718	-2'735'979
				9'952	565'020
				0'362	-7'257'254
				8'000	43'538
				9'995	-66'307
				0'651	-4'503'973
				8'383	4'338'422
				5'185	-431'908
				0'808	-1'269'806
				8'019	-33'487
				1'610	-4'876'788
				6'238	-509'877
				3'259	-4'850
				8'214	57'782



Cost Impact:

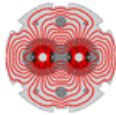
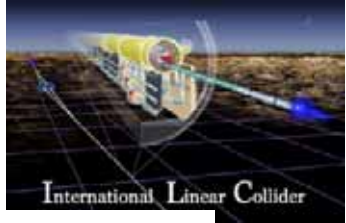
- budgetcode **96411**: cost reduction **1'300** CHF

Schedule Impact:

- No impact

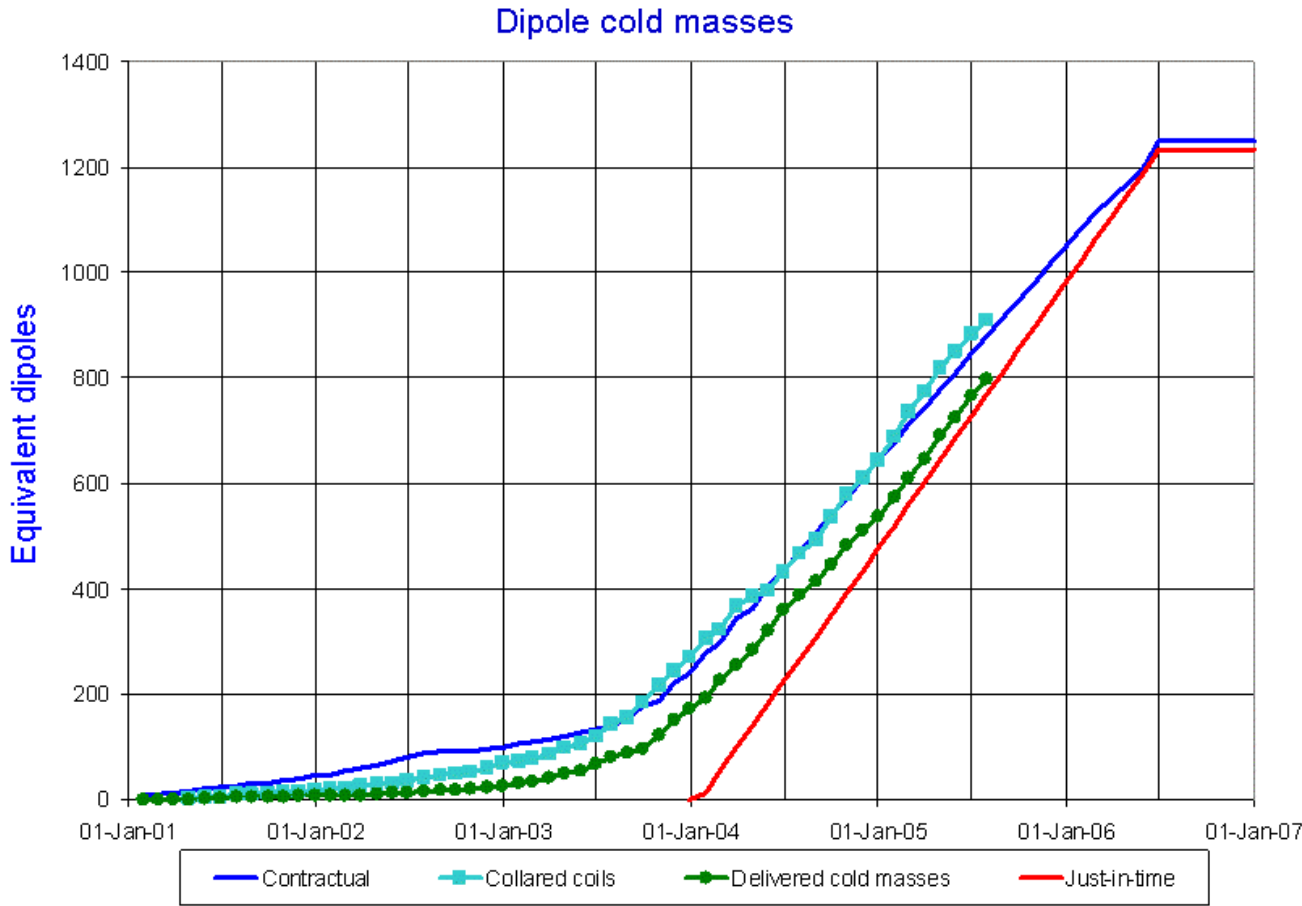


LHC Dashboard



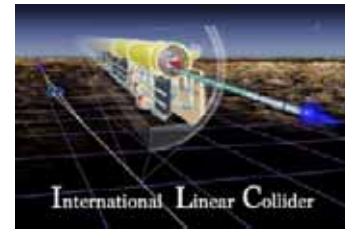
LHC Progress
Dashboard

Accelerator
Technology
Department





Activity Planning Tool (APT)

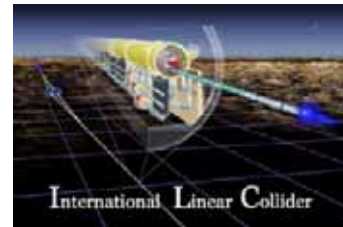


CERN wide strategic planning

- **Planning of ALL (Material + Personnel) resources for ALL CERN activities for 2005-2015**
- **Work Breakdown Structure (WBS) with necessary resources (M & P) for each planned activity**
- **Allocate available resources according to priorities and identify missing resources**
- **Man-Power Plan (short and long term) and preparation of succession/recruitment plan**
- **Evaluate impact of optional projects against available resources (e.g. skills)**
- **Online Help:**
http://ais.web.cern.ch/ais/apps/ppt/apt/apt_online_help.html



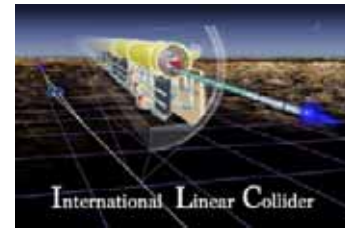
CERN Document Server (CDS)



- CDS Software for electronic document archival and retrieval system.
- Main functionalities:
 - Powerful search engine with Google-like syntax
 - Automatic extraction of references and figures and automatic key-wording for HEP documents
 - Easy electronic submission of documents
 - Automatic document conversion (to PDF or PostScript)
 - Personalization options including document baskets and email notification alerts
- CDSware, freely licensed under GNU General Public Licence
- CERN catalogue contains about 750k metadata records and 350k full texts organised into >500 collections
- At CERN, each month: 12,000 unique visitors - 120,000 searches
- URL <http://cds.cern.ch>



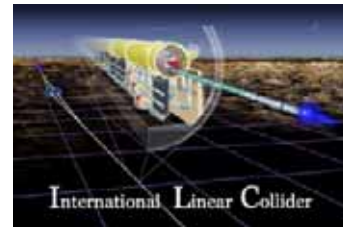
InDiCo



- **Integrated Digital Conference management (URL <http://indico.cern.ch>)**
- **Easy to use web-based interface with user authentication**
- **Management of timetables for meetings, workshops and conferences**
- **Attach multimedia presentation material to talks and archival of all material**
- **Agendas stored in multi-level hierarchical tree**
- **Easy production of proceedings and management of participants (for large conferences)**
- **Funded by EU as part of FP6 (Partners were CERN, SISSA & Udine (IT) and Univ Amsterdam(NL))**
- **CERN provided a complete software package for the planning, management and archival of any type of conference**
- **Developed from CDS Agenda > 10,000 agendas created, >70,000 talks (including multimedia material) in the database**
- **Currently all meetings created using CDS Agenda are being migrated to InDiCo providing better linking to CDS and better searching capabilities**



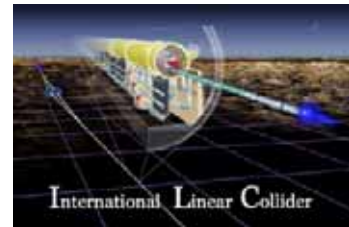
Management Information Systems (MIS)



- A comprehensive range of MIS tools is available
<http://cern.ch/ais> (see next slide)
- This includes a suite of office automation functions and decision support tools, implemented to provide a user friendly interface to corporate data for all relevant staff.
 - the E-business tools or Electronic Data Handling (EDH),
 - the Personnel Data Base or Foundation application,
 - CERN Expenditure Tracking (CET),
 - the Human Resources Toolkit (HRT)
 - the Staff Monitoring Tool (SMT),
 - People Institutes and Experiments (PIE),
 - Personnel Administration for Divisions (PAD),
 - Contract Follow-Up (CFU).
- The E-Business tools (EDH), Foundation and Cern Expenditure Tracking (CET) applications may be of interest.



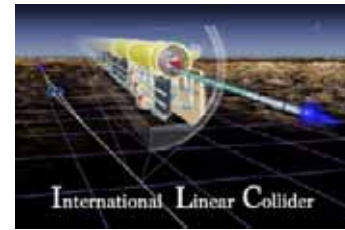
E-business tools (EDH)



- **The Electronic Business Application or Electronic Data Handling (EDH) is a system which lets CERN users create and authorize a variety of official documents.**
- **EDH has replaced the high volume paper based business procedures with streamlined electronic workflow, validating data against corporate databases and automatically generating the end-result with minimum human intervention.**
- **The EDH server handles document creation, routing, authorization, and subsequent archiving. Currently, the application is CERN's most used software, covering more than 40 business procedures, with of the order of 10000 registered users and 2000 users/day.**



EDH Business Procedures

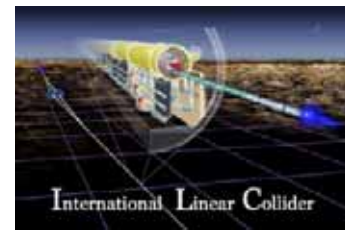


The business procedures include:

- **Administration:** EDH Admin, LeaveAdmin, Management of Intersection Codes, Reroute Document
- **Claims:** Advance, Home Leave, Installation, Official Travel, Request For External Funds, School Fees, Subsistence, Sundry Expenditure, Third Party Claim
- **HR & Training:** Appraisal Report (MAPS), External Training Request, PAF Summary, Request for opening a post, Skills Entry, Training Catalogue
- **Leave:** Leave Cancellation, Leave Overview, Leave Request, Leave Transactions, List of Leaves, Overtime Request, Overtime Summary, Personal Schedule
- **Logistics:** Shipping Request (Arrival), Shipping Request (Expedition), Transport Request (CERN site)
- **Other Services:** Access Request, Epool Catalogue, Epool Rental Request, GSM Subscription Request / Modification
- **Purchasing:** Departmental Request (DR), Electronic Invoice, Inter Departmental Transfer (TID), Material Request (Stores), OSVC, Purchase Requisition (DAI), Stores Catalogue, Temporary Labour
- **Safety:** AOC Overview, AOC Task Overview, Disable/Enable Alarm (IS37), Fire Permit, IS37 Overview, Work Request (AOC/IS39)



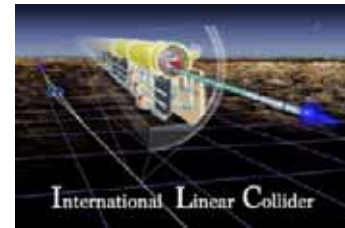
Personnel Data Base (Foundation)



- Every AIS application needs to access referential data such as persons, CERN's hierarchical structure of organization units, addresses, and roles. The Foundation referential data application was developed in house to satisfy these needs.
- The Foundation database has been designed and implemented to make this data available to these applications, and to applications not maintained by the AIS Project team. By reusing this common Foundation layer, the applications ensure a coherent view of the data.
- Foundation is the 'glue' that holds all applications together. It avoids data duplication and coherence problems. The entities held in Foundation are, for example: Suppliers, Clients, People, Addresses, Organization units (division/group/project/section etc), and Relations between these entities (roles of people etc).



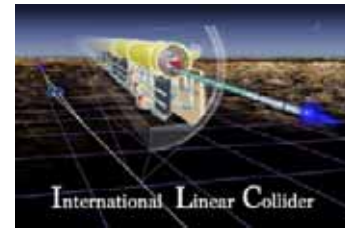
Recommendation for ILC based on LHC Experience



- **Use EDMS for all phases of the project from the very beginning including the R&D phase:**
 - Depositary of all information available world-wide
 - Collective information available through the whole duration of the project (history)
 - Configuration control by distributed management
 - Change request management from BCD to reference design to technical design
- **Implement EVM based on WBS structure from the project start:**
 - Clear definition of work-packages, resources and responsibility
 - Awareness of the importance of budget and deadlines
 - Essential for control of large and distributed project
 - Full transparency extremely important for the laboratories involved and for the public
- **Align budget codes structure with EVM/WBS structure**
- **Common data base with unique source of updating**
 - Specific applications accessing common data base (technical, budget, personnel)



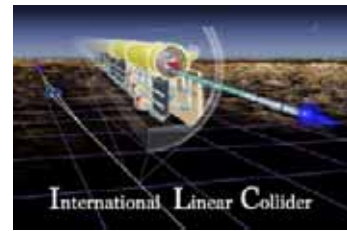
LHC project and CERN management tools available for ILC



- **ILC and LHC (accelerator and detectors)
are comparable projects:**
 - Large size and resources
 - Long time-scale
 - World-wide collaborations
 - Large industrialisation
- **CERN ready to offer and host for ILC the
tools which have been developed for:**
 - the LHC project and detectors
 - the Laboratory management



LHC/EVM possible improvements?



- Temporal constraints between tasks are missing
- This of course also implies that no scheduling algorithms are implemented
- Implementing Critical Path Method (CPM) would be useful to complement weaknesses of EVM
- Establish more formal procedures for baselining (including Integrated Baseline Review support)
- Need to implement integrated workflow for (Engineering) Change Requests and the outcome of Project Leader's decisions. Clarify impact on Management Reserve
- The LHC dashboard should be generated directly from the EVM system
- Dealing with granularity:
 - Difficult to cater for users who want to do the minimum to comply (sometimes because they have their own system in place) and other users who want to use the tool for every detailed task. This results in varying granularity. While EVM deals very well with this, it can make it difficult for humans to see the wood for the trees and for scheduling and CPM to be really useful
 - We would need to implement some "summary tasks or milestones" that represents a set of detailed workunits