ILC CFS & GLOBAL SYSTEMS MEETING

CONVENTIONAL FACILITIES AND SITING GROUP

CFS Status Report in Preparation for the September, Albuquerque Meeting

V. Kuchler, J. Osborne, A. Enomoto

Overview

- Update on AD&I Central Region Layout
- Main Linac Tunnel Configuration Comparison
- Preparation of Joint JINR/GDE Publication
- CLIC/ILC Collaboration Activity
- General Report on KEK CFS Activities
- Life Safety and Egress Document
- Preparation for AAP Review in January, 2010

Update on AD&I Central Region Layout

- The First CFS AD&I Meeting was Held at SLAC on July 20-21
- A Second Meeting is Planned at the Daresbury Laboratory, UK on September 3-4
- The Daresbury Agenda Provides time for Discussion with Each Area System (Just as with the SLAC Meeting)
- The Weekly CFS Meeting has been Used for Direct Discussion with Area System Representatives to Finalize Area System Criteria and Layout Requirements
- With the Exception of the Question Regarding the Main Linac Gradient, all of the SB 2009 Working Assumptions are Reflected in the Criteria Developed for the Various Ares Systems
- Initial 2D Drawings are Being Prepared at FNAL with Consultant Support and will be Used as the Basis for Discussion at the Daresbury Meeting
- 2D Drawings Consist of Overall Layouts, Larger and More Detailed Drawings of Specific Areas and Cross Sections Taken at Various Points to Analyze Beamline Locations and Conflicts
- 3D Layout Drawings are Beginning to be Prepared at CERN with Efforts at FNAL and KEK to Begin in the Near Future

Update on AD&I Central Region Layout cont.

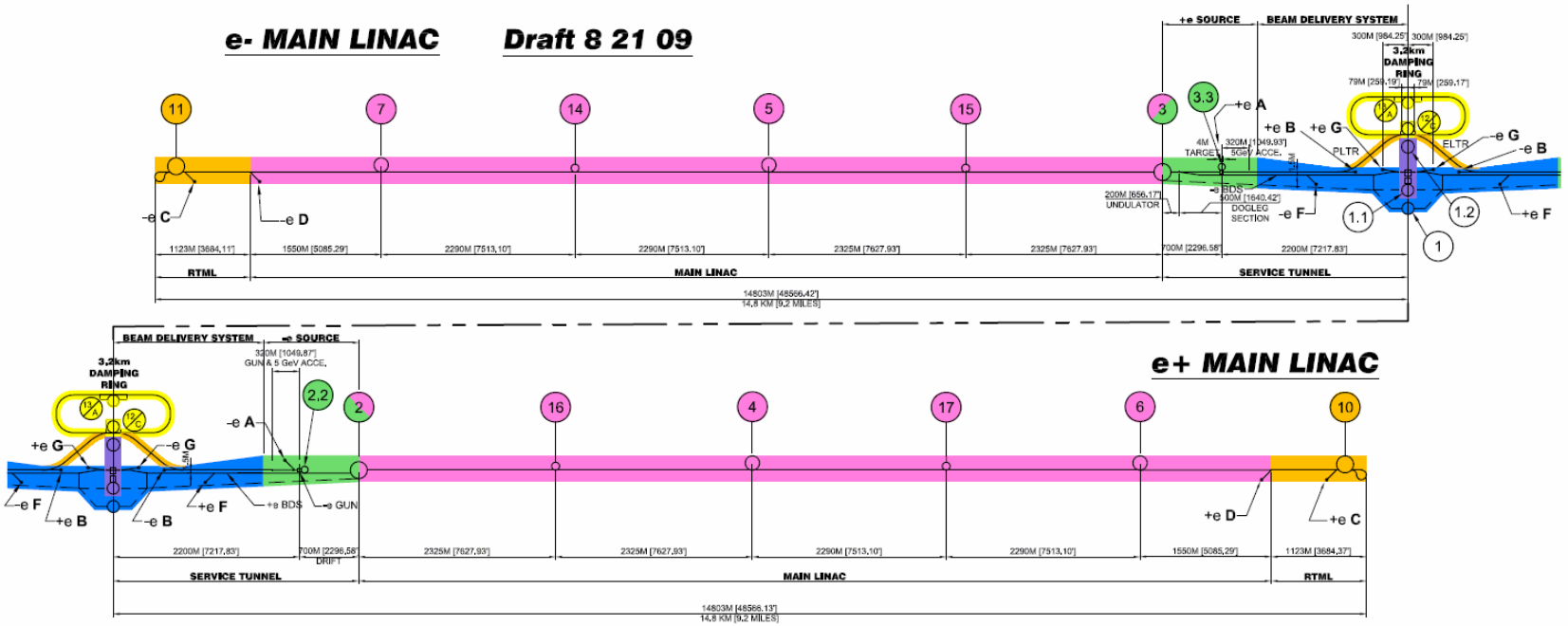
- The Daresbury AD&I Meeting will be Used to Finalize Area Systems Criteria and Review Drawings Completed to Date
- All Work will be Updated Prior to the Albuquerque Meeting so that a Complete 2D Baseline Drawing Package will be Available at That Time
- A Complete CFS 3D Drawing Package will be Available by the Albuquerque Meeting as well. A Full 3D Drawing (Including Machine Layout) Should be Completed by the Next Project Wide AD&I Meeting at DESY (Date TBD)
- A Majority (80%) of the Heat Load Criteria for the New Configuration is Understood, Temperature Stability (50%) Still Needs More Work
- Status of Klystron Cluster and DRFS Information and Cost Estimates:
  - **Americas Region**
    - Klystron Cluster Design and Cost Estimate Complete
    - DRSF Design and Cost Estimate in-Progress
  - **Asian Region**
    - Klystron Cluster Design Complete, Cost Estimate in-Progress
    - DRFS Design Complete, Cost Estimate in Progress
  - **European Region**
    - Klystron Cluster Design and Cost Estimate in-Progress
    - DRFS Design and cost Estimate in Progress
  - **Work in All Regions is Expected to be Completed by the Albuquerque Meeting**

CFS AD&I MEETING AGENDA

Daresbury Laboratory, UK

September 3-4, 2009

Regional Meeting Times		Spetember 3, 2009 Topic	Area System Representatives	September 4, 2009 Topic	Area System Representatives
0030-0200 SLAC 0230-0400 FNAL	0830-1000 DL, UK 1630-1800 KEK	General Introduction	In-House Participants	Damping Ring	S. Giuducci
0200-0230 SLAC 0400-0430 FNAL	1000-1030 DL, UK 1800-1830 KEK	Break		Break	
0230-0400 SLAC 0430-0600 FNAL	1030-1200 DL, UK 1830-2000 KEK	e+ Source	J. Clarke N.Collomb	Beam Delivery System	D. Angal-Kalinin
0400-0500 SLAC 0600-0700 FNAL	1200-1300 DL, UK 2000-2100 KEK	Lunch		Lunch	
0500-0630 SLAC 0700-0830 FNAL	1300-1430 DL, UK 2100-2230 KEK	RTML	N. Solyak	General Review	In-House Participants
0630-0700 SLAC 0830-0900 FNAL	1430-1500 DL, UK 2230-2300 KEK	Break		Break	
0700-0800 SLAC 0900-1000 FNAL	1500-1600 DL, UK 2300-2400 KEK	e- Source	A. Brachman J. Shepard	Main Linacs	C. Adophsen
0800-0900 SLAC 1000-1100 FNAL	1600-1700 DL, UK 0000-0100 KEK	Overview with E. Paterson	E. Paterson	Overview with E. Paterson	E. Paterson



SITE / TUNNEL LENGTHS (M)

e- SIDE ML + RTML	e+ SIDE ML + RTML	B,D,S,/SOURCES SERVICE/FTRL/PTRL	DAMPING RING	TOTAL
13233	13233	5800 + 5800 + 600	3238	41904

TUNNELS

AREA SYSTEM	e- INJECT. & BDS/SERVICE	D.R.	R.T.M.L. BEAM	MAIN LINAC BEAM	e+ INJECT. & BDS/SERVICE
width M	9.5 + 5.2	5.2	5.2	5.2	9.5 + 5.2

SHAFT BASE CAVERNS

POINT	2, 3,	4, 5, 6, 7,	10, 11	14, 15, 16, 17
(L x W x H)m	52 x 10 x 5.3			3 x 3 x SHAFT

SHAFTS

POINT	1.0	1.1	1.2	2	2,2	3	3.3	4	5	6	7	10	11	12/C	13/A	14	15	16	17
Ø M	9	16	16	14	4	14	4	14	14	9	9	14	14	9	9	3	3	3	3

DETECTORS HALL

POINT	1.1, 1.2	1.0
(L x W x H)m	120 x 25 x 39	40 x 15 x 15

MUON WALL WIDENINGS

POINT	BDS -eG & +eG
(L x W x H)m	25 x 7 x 6 +15 x 7 x 6

LEGEND

- RTML
- ML
- SOURCES
- DR
- BDS
- DETECTOR AREA

SOURCES CAVERNS

POINT	e+ SOURCE
(L x W x H)m	40 x 40 x 8

DAMPING RING

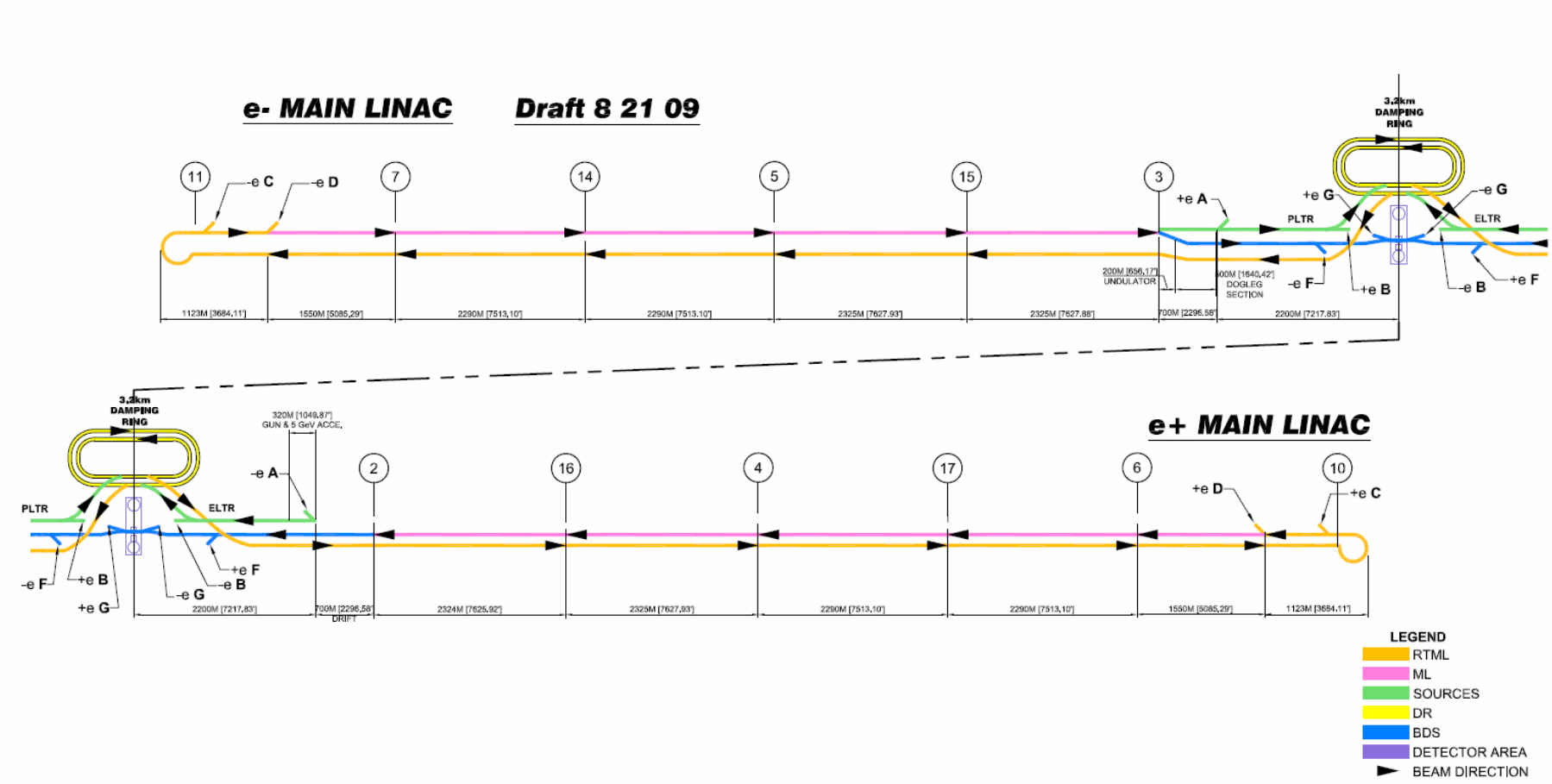
POINT	12/C	13/A
(L x W x H)m	10 x 10 x 5	74 x 10 x 5

BEAM ABORT CAVERNS ( )

POINT	SOURCES -aA & +aA	RTML -eC, -eD, +eC & +eD	BDS -eB, -eF, -eG,+eB, +eF & +eG
(L x W x H)m	5 x 4 x 4		20 x 9 x 15 +1 STORY

BEAM ABORT SERVICE HALLS ( )

POINT	BDS -eB, -eG,+eB & +eG
(L x W x H)m	30 x 20 x 10


e- MAIN LINAC
Draft 8 21 09
3.2km DAMPING RING
11
-e C
-e D
7
14
5
15
3
+e A
+e G
PLTR
-e G
ELTR
-e F
+e B
-e B
+e F
200M [656.17']
UNDULATOR
400M [1640.42']
DOGLEG SECTION
1123M [3684.11']
1550M [5085.29']
2290M [7513.10']
2290M [7513.10']
2325M [7627.93']
2325M [7627.88']
700M [2296.58']
2200M [7217.83']
3.2km DAMPING RING
320M [1049.87']
GUN & 5 GeV ACCE.
e+ MAIN LINAC
-e A
2
16
4
17
6
10
+e D
+e C
PLTR
ELTR
-e F
+e B
+e G
-e G
-e B
+e F
2200M [7217.83']
700M [2296.58']
DRIFT
2324M [7625.92']
2325M [7627.93']
2290M [7513.10']
2290M [7513.10']
1550M [5085.29']
1123M [3684.11']
LEGEND
RTML
ML
SOURCES
DR
BDS
DETECTOR AREA
BEAM DIRECTION

Main Linac Tunnel Configuration

- Hanson Engineering Continues Work on the Completion of this R&D Plan Milestone
- T. Lundin (Hanson) Attended the Workshop at DESY to Review the JINR/Dubna Geotechnical Report for the Proposed ILC Sample Site in June 2009
- 2-Day Workshop was Held at FNAL on Aug 3-4 to Review Progress and Begin the Process to Develop Cost Estimates for Tunnel Configuration Alternatives
- A Second 1-Day Workshop was held at FNAL on Aug 24 to Review Final Configuration Analysis and Preliminary Cost Estimates
- Draft Information is Expected by Mid-September with Final Report to be Completed by Nov 1
- A Project Manger's Review Of Tunnel Alternative Information and Cost Estimates will be Scheduled in September Prior to ALCPG 09

Main Linac Tunnel Configuration

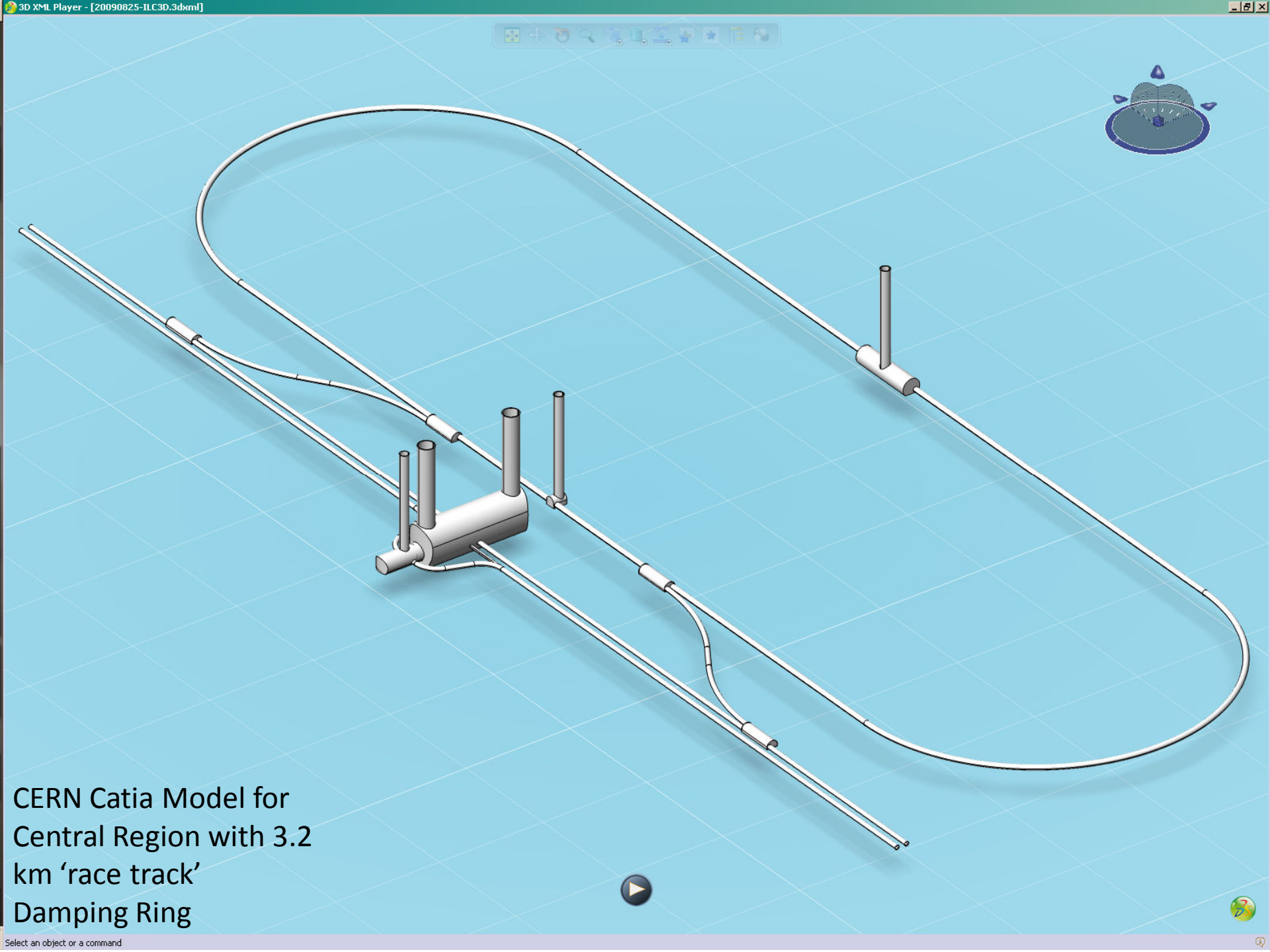
- Hughes Engineering is Currently Working on the Life Safety and Egress Aspects for Each of the Tunnel Configurations
- An Exiting Model, Based on Prevailing United States Codes, will be Developed for Each of the Tunnel Configuration Types
- Recommendations will Also be Provided for HVAC and Exhaust Criteria as part of the Life Safety Analysis
- A Draft Report is Expected by Mid-September with the Complete Report Due by Nov 1
- The Hughes Report will be Incorporated into the Comprehensive Life Safety Document Being Developed in Conjunction with CERN and KEK
- Hughes is Also Available to Participate in the Development of the Overview Portion of the Comprehensive Life Safety Document to Provide an Independent Perspective of Commonalities and Distinctions Present in the Various Regional Reports

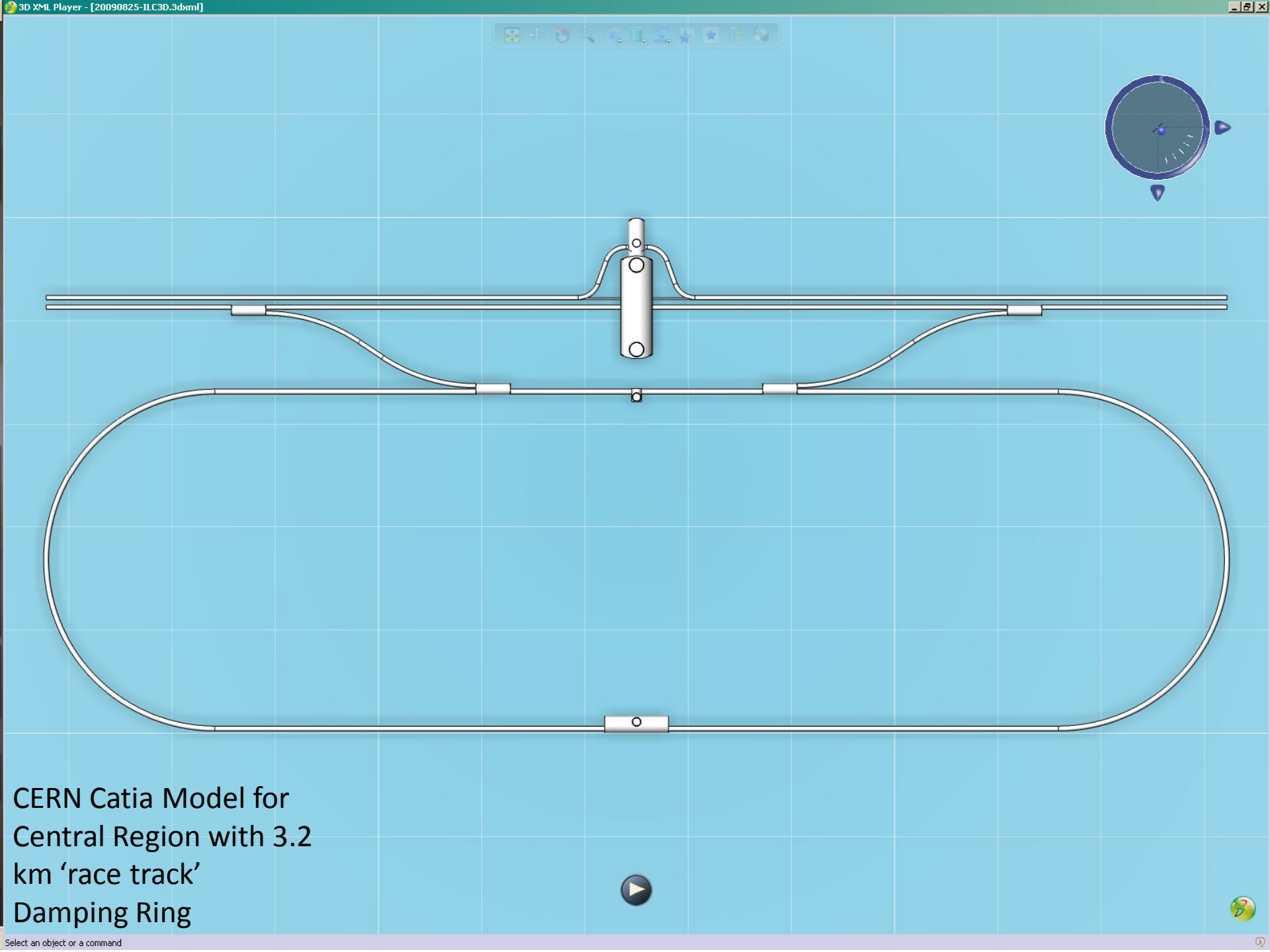
Preparation of Joint JINR/GDE Publication

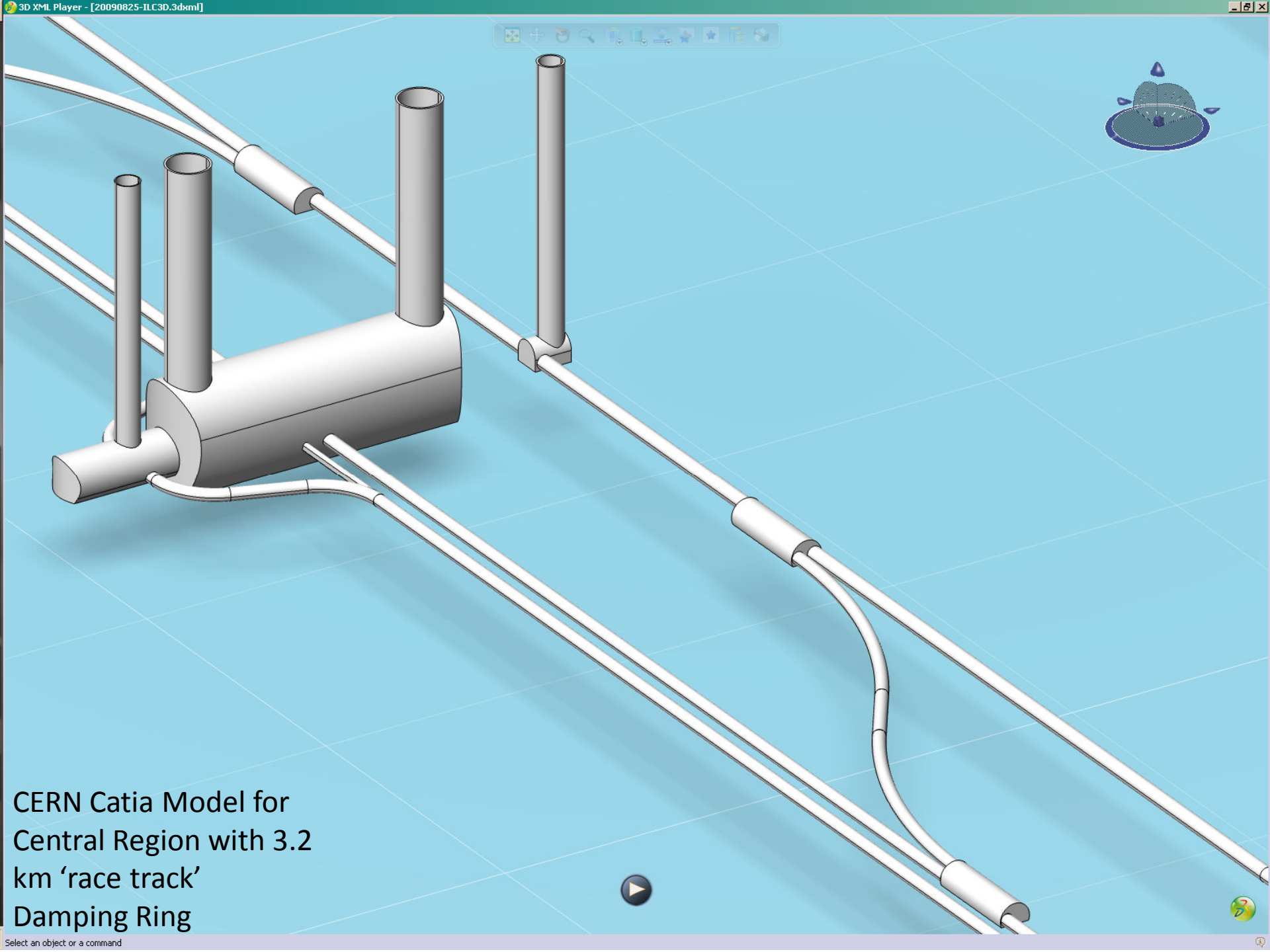
- Initial Joint GDE/JINR Meeting was Held at DESY, June 24-25
- An Outline for a Joint Document was Developed at that Meeting
- Initial Schedule and Status
  - Preliminary Descriptions for Report Chapters – July 10 – Completed
  - Release Agreement Signed – July 10 – Partially Completed
  - First Draft Including Original Report Translation – July 31 – Original Geotechnical Report is Mostly Translated but Draft of Joint Document is Still in Progress
  - First Full Draft with Introduction and Summary – August 14
  - First Edit – August 28
  - Final Document – September 11
- Attention is Needed to Ensure the Schedule is Met and the Joint Report is Completed by the Albuquerque Meeting

- ***CLIC/ILC Collaboration Activity***
  - ***CERN consultants (Amberg) are working on European cost estimates for the re-baseling single tunnel solutions :***
    - Klystron Cluster Scheme HLRF
    - DRFS (Distributed RF) scheme
  - ***Life Safety is also part of this study (transversal ventilation with fire barriers, as per CLIC, or fire refuge areas)***
  - ***Joint CES / CLIC C&S WG meeting to review ILC re-baseling/cost impact on 9th September.***
  - ***The results of this study will be presented at Albuquerque Meeting***

- **CLIC/ILC Collaboration Activity**
  - CERN draughtsman is working on 3d model for ILC central region based on new 2d plans developed at FNAL
  - This is purely for civil engineering, the machine and services need to be added later…..
  - First results will be discussed at Daresbury
  - See following slides for initial 3d models for Central Region

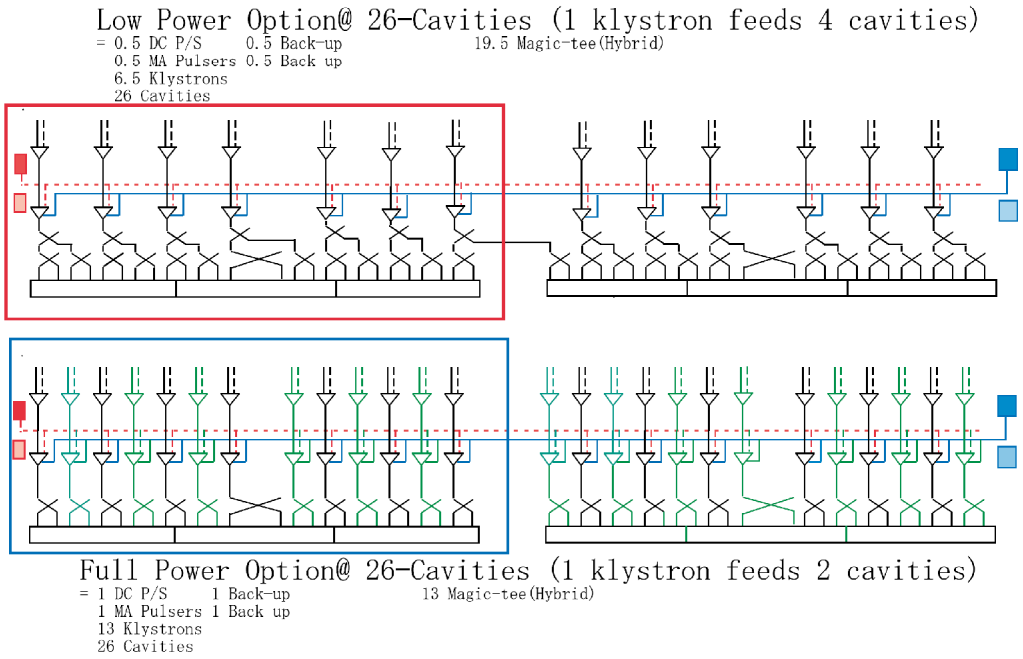

3D XML Player - [20090825-ILC3D.3dxml]
CERN Catia Model for
Central Region with 3.2
km ‘race track’
Damping Ring
Select an object or a command


3D XML Player - [20090825-ILC3D.3dxml]
CERN Catia Model for Central Region with 3.2 km ‘race track’ Damping Ring
Select an object or a command


3D XML Player - [20090825-ILC3D.3dxml]
CERN Catia Model for Central Region with 3.2 km ‘race track’ Damping Ring
Select an object or a command

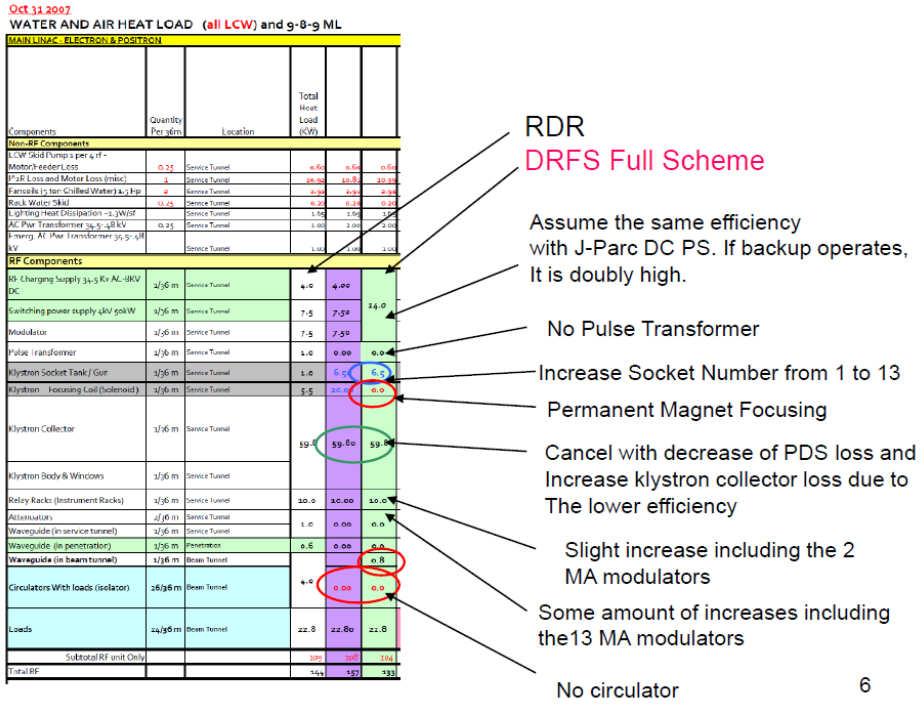
General Report on KEK CFS Activities

- **DRFS design and developments**
  - **Fixed the basic system configuration (see fig.)**
    - **A 650 kW klystron feeds 4 cavities in Low-power op. of SB2009.**
    - **A DC- and a pulsed-power supplies provide 13 klystrons.**



KEK CFS Activities (cont.)

- *New heat load table was given (see below)*
- *Cooling system design will be discussed hereafter*
- *Entire tunnel configuration will be considered after that*
- *Preliminary cost update will be done by ALCPG09.*



Oct 31 2007

WATER AND AIR HEAT LOAD (all LCW) and 9-8-9 ML

MAIN LINAC - ELECTRON & POSITRON

Components	Quantity Per 36m	Location	Total Heat Load (KW)		
Non-RF Components					
LCW Skid Pump 1 per 4 rf - Motor/Feeder Loss	0.25	Service Tunnel	0.62	0.62	0.62
I²aR Loss and Motor Loss (misc)	1	Service Tunnel	10.82	10.82	10.82
Fancoils (5 ton Chilled Water) 2.5 Hp	2	Service Tunnel	2.34	2.34	2.34
Rack Water Skid	0.25	Service Tunnel	0.31	0.31	0.31
Lighting Heat Dissipation ~1.2W/sf		Service Tunnel	1.56	1.56	1.56
AC Pwr Transformer 34.5-.48 kV	0.25	Service Tunnel	1.00	1.00	1.00
3-wnrg. AC Pwr Transformer 34.5-.48 kV		Service Tunnel	1.04	1.04	1.04
RF Components					
Klystron Charging Supply 34.5 Kv AC-48KV DC	1/36 m	Service Tunnel	4.0	4.00	14.0
Switching power supply 48V 50kW	1/36 m	Service Tunnel	7.5	7.50	
Modulator	1/36 m	Service Tunnel	7.5	7.50	
Pulse Transformer	1/36 m	Service Tunnel	1.0	0.00	0.0
Klystron Socket Tank / Gun	1/36 m	Service Tunnel	1.0	6.5	6.5
Klystron Focusing Coil (Solenoid)	1/36 m	Service Tunnel	5.5	20.0	0.0
Klystron Collector	1/36 m	Service Tunnel	59.8	59.80	59.8
Klystron Body & Windows	1/36 m	Service Tunnel			
Relay Racks (Instrument Racks)	1/36 m	Service Tunnel	10.0	10.00	10.0
Attenuators	1/36 m	Service Tunnel	1.0	0.00	0.0
Waveguide (in service tunnel)	1/36 m	Service Tunnel			
Waveguide (in penetration)	1/36 m	Penetration	0.6	0.00	0.0
Wareguide (in beam tunnel)	1/36 m	Beam Tunnel			0.8
Circulators With loads (isolator)	26/36 m	Beam Tunnel	4.0	0.00	0.0
Loads	24/36 m	Beam Tunnel	22.8	22.80	22.8
Subtotal RF unit Only			309	300	184
Total RF			144	157	133

RDR

DRFS Full Scheme

Assume the same efficiency with J-Parc DC PS. If backup operates, It is doubly high.

No Pulse Transformer

Increase Socket Number from 1 to 13

Permanent Magnet Focusing

Cancel with decrease of PDS loss and Increase klystron collector loss due to The lower efficiency

Slight increase including the 2 MA modulators

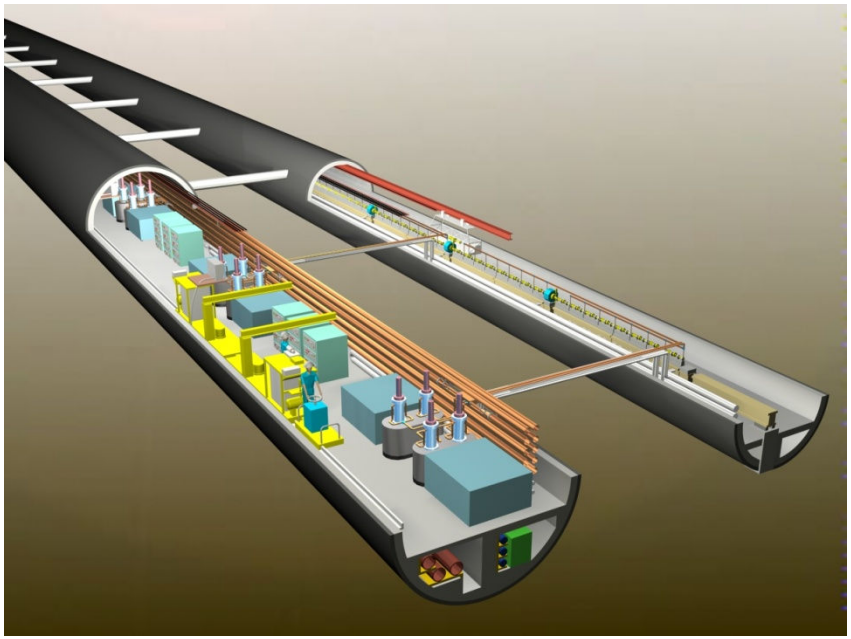
Some amount of increases including the13 MA modulators

No circulator

6

KEK CFS Activities (cont.)

- **3-D CAD Collaboration**
  - **KEK will first join 3-D CAD meeting on August 27th.**
    - **KEK searches the way to join it with a consultant company.**



JPower

http://www.jpower.co.jp/english/index.html

has experiences for JLC/GLC design, ILC Asian sample site study:

- Effective device layout study in tunnels is carried out efficiently using 3D display tool.
- Engineers carry out layout study visually with parts of devises converted into CAD data.

Life Safety and Egress Global Document

- LHC Document is Complete
- XFEL Document has been Translated into English
- CLIC Document is Being Developed
- Asian Region Document is Complete
- The Life Safety and Egress Document for the Main Linac Tunnel Alternatives is Currently Being Prepared at FNAL with Consultant Support
- All Individual Documents will be Compiled into a Single Comprehensive Document with an Executive Summary Which will Describe Commonalities and Distinctions with Respect to the Various Reports. The Executive Summary will be Added to Complete the Document Prior to the AAP Review in January, 2010

Preparation for AAP Review

- The Basis of the AAP Review will be the New ILC Baseline Criteria and Configuration
- Comments and Recommendations From the Previous AAP Review (April, 2009) will also be Addressed
- The CFS Value Engineering and Alternative Review Process will be Completed
- New CFS Baseline Layout will be Fully Developed
- New Baseline Layout will Incorporate all Decisions from Project Managers Regarding the SB 2009 Working Assumptions
- The CFS Group will Also Report on Progress Against the CFS Milestones Indicated in the ILC R&D Plan Updated to Reflect Adjustments Required for the Beginning of TDP II

Preliminary Ideas for ALCPG 09 CFS Parallel Sessions

- In General, CFS Parallel Sessions will be Topic Oriented Rather than Devoted to Specific Area Systems as in the SLAC and Daresbury Meetings
- Currently the Following Topics are Being Considered
  - Direct Presentation of Complete CFS AD&I Baseline Layout to All Area System Representatives
  - Working Session for Finalization and Review of Heat Load and Temperature Stability Requirements
  - Internal Discussion of Specific Differences for Regional Shaft, Cavern and Enclosure Design and Configuration
  - Internal Discussion of Baseline Life Safety and Egress
  - Internal Review of all CFS Cost Estimates
  - Near Term Planning for Drawing (2D and 3D) Completion
  - Planning for TDP II
- The CFS Group will also Participate in Two Plenary AD&I Sessions and a Joint Session with the Cost Management Working Group
- Final Topic Definition and Time Slot Assignments are Still to be Determined

Summary

- The CFS Group is Making Good Progress on R&D Plan Milestones and AD&I Efforts
- The Transition from In-House Effort to Consultant Based Support at FNAL Did Extend Planned Durations for the Completion of Some WorkTasks
- The Scope of Some of the CFS Tasks was Expanded from Original Expectations
- In General, Assigned CFS Tasks will be Completed to Support the Development of the New ILC Baseline Criteria and Layout to Begin TDP II