GEM TN-93-260

Central Tracker Meeting - SSCL

December 17, 1992

Abstract:

Agenda, attendees, and presentations of the GEM Central Tracker Meeting held at the SSC Laboratory on December 17, 1992.

Tracker Mtg. with Tim Thompson
December 17, 1992
SDC Conference Room
9:00-11:00 & 2:00-5:00

1. Tracker and beam pipe support

2. Tracker services

3. Tracker assembly

4. Tracker installation

5. Tracker access and maintenance

6. Alignment

GEM Central Tracker Meeting
December 17, 1992
Mike Harris, Presiding

Attendees:

Gerry Chapman
Mike Gamble
Richard Guthrie
Mike Harris
Mike Laramie
David Lee
Kate Morgan
Tim Thompson
Ronn Woolley

cc: Sandler

Minutes of Central Tracker Meeting

M. Gamble

December 17, 1992

Mike Harris Remarks:

There is not much time until Christmas, therefore, we must resolve TDR issues asap and proceed.

Gerry Chapman - Beam Pipe Assembly:

Attachment is the big issue. T. Thompson does not want to attach the pipe to the CT because the beam pipe is noisy (vibrations) and may conduct electrical currents. Calorimeter attachment of the beampipe is desired. IPC's are wire chambers and are very sensitive to vibrations. The load path for the CT is to the calorimeter through IPC hardpoints. Gerry Chapman says beam pipe adjustment will be a problem if not attached to the CT. Kate Morgan suggests remote beam pipe articulation for adjustment (realignment). Long term settling must also be considered. Kate also suggests CT alignment to calorimeter should not be disturbed, CT/Calorimeter act as a rigid body.

Tim Thompson takes issue with this based upon the kinematic mounting concept put forward for the CT.

A CT on kinematic mounts will be easier to control remotely than a beam pipe suspended by wires. (may require 0 CTE carbon fiber suspension).

Mike Harris says calorimeter vibration inputs to the CT will be much greater than beam pipe inputs.

The polyethylene around the CT is mounted to the Calorimeter. The beam pipe can attach to the enclosure for the polyethylene. Some lead will likely be around the poly.

For the TDR, Gerry will show the beam pipe suspended from the outer radius of the poly. (Perhaps on an overhang).

Finite element analysis of the beryllium beam pipe's gravity-induced sag is underway.

Approximately 1mm wall thickness of SS beam pipe section is envisioned.

LANL will modify CT elevation view drawing to show poly overhang.

Richard Guthrie - Services:

Services must be cross checked, LANL-vs-Richard's list to use in TDR. Services may be placed in a separate section.

Connectors for the CT penetrate the poly then route up the central detector support.

Symmetric service routing from the CT is planned.

Richard has a table of services to be compared to LANL's. Kate Morgan suggests that R. Guthrie has wasted his time in this exercise. Tim Thompson will provide Mike Harris a view of all services emanating from the CT. Electrical power, signal, butane, etc will be

included. An endview of the CT with services emanating outward is needed. January 21, 1993 Mike Harris will show space allocations. He would like a first cut at this sketch by the 8th of January.

EFD has interest in the CT gas system. Where will they begin to pick up the system? In/out of the detector. Title 1 of the gas building is soon to begin.

Mike Laramie of EFD needs this information.

Gerry Chapman asks to vent butane in CT when he is activating the NEG pump. T. Thompson claims this can be a problem for CT deformation.

Ronn Woolley says ignition source near CT full of butane is <u>not</u> a safety problem for current CT design.

<u>CT Assembly & Installation</u>

CT assembly space is now very long and narrow. It would be better to have a near square floor plan.

Gerry Chapman beam pipe construction can be relocated to correct this problem.

Kate Morgan and Tim Thompson must determine the CT effective installation length. A cradle is used to rig the 4m-long CT with cables/services/frame - total length > 4m for installation purposes.

Mike Harris suggests temperature/pressure monitoring cables may not be broken at CT ends. Perhaps they should be continuous and located on a cage on the end of the system for installation.

LANL should give Mike Harris a sequenced list of how the CT will be assembled on site (uphole). Mike Harris will feed this into the TDR assembly section. A similar list for installation is required.

<u>Access/Maintenance</u>

Pulling the magnet back for access is required. Only access is once per year. CT reliability must accommodate this scenario.

A 5 month shutdown may be required if the CT is removed. D. Lee will answer this question: How much Silicon and IPC deterioration can be tolerated before the tracker is not effective enough and must be removed.

<u>Alignment</u>

Mike Harris says services determine alignment problems for light systems. Is CT alignment possible in view of this?

The CT may hang on its stiff services.

D. Lee suggests trial run with a fidricial at the centroid of the CT to see what happens when the system is "buttoned up".

True kinematic mounting (V-grove/Ball/Flat) attachment to the calorimeter is envisioned. T. Thompson suggests visco-elastic damper material for the interface of the CT and calorimeter may be required to reduce vibration transmission.

ACTION ITEMS:

1. G. Chapman: Develop a schematic of the beampipe suspended from the poly outer radius for the TDR.
2. T. Thompson: modify CT elevation drawing to reflect poly overhang for beampipe suspension.
3. T. Thompson: Provide M. Harris an endview of CT with electrical power, output signal, butane coolant etc. services emanating outward. First cut sketch is due by January 8, 1993.
4. G. Chapman: Provide M. Harris a sketch of services and their routing out of the detector.
5. T. Thompson: Determine the CT "effective" assembly length.
6. T. Thompson: Provide a CT assembly and installation sequence (Assume onsite and uphole).
7. D. Lee: Determine silicon and IPC degredation allowed before the CT is rendered in effective enough to warrant removal and repair.

Central Tracker Meeting
Presented By

Gerry Chapman
SSCL

Central Tracker Meeting
Presented By

Richard Guthrie
SSCL

Interpolating Pad Chamber Interfaces					
Facility Interface	**Type**	**Size**	**Qty**	**Material**	**To/From**
IPC Read Out Data Readout & Clock/Trigger	Fiber Optic	12.5 mm diam/ 32 FO Bundle (1563 FO = 49 Bundles)	49	Fused Silica	Electronic Room to IPC MCM chip
IPC Tracker Power/Signal Cabling • Bias Voltage • Low Voltage Power • Slow Control System • Test Signal • Remote Control • Temperature Sensors • Calibration Cables	Conventional Electrical Cables (?)	TBD	TBD	Kapton Insulator with copper of aluminum metal (?)	Counting Room to IPC Endcap
IPC Alignment Monitoring System	Fiber Optic (will probably be similar to Si Tracker)	1.12 mm diam./ bundle	5	Fused Silica	IPC Shell to Electronics Room (IPC Alignment Monitoring System)

Interpolating Pad Chamber Interfaces (Cont.)					
Facility Interface	**Type**	**Size**	**Qty**	**Material**	**To/From**
Interpolating Pad Chamber Gas System	CO2/CF4 Gas Inlet	0.5" dia.	2	Stainless Steel	Gas Mixing Room to IPC Endcap Manifold
	CO2/CF4 Gas Outlet	1.0" dia.	2	Stainless Steel	IPC Endcap Manifold to IPC Gas Reclamation System
Interpolating Pad Chamber Cooling System	MC House Water Inlet		1		MC House Water Refrigeration Unit to IPC Cooling Manifold
	MCHW Outlet		1		IPC Cooling Manifold to MCHW Pump Station
Interpolating Pad Chamber Bonding	Electrical Bonding Straps	**TBD**	**TBD**	Aluminum or Copper (?)	IPC to Calorimeter or Central Support Ground Attach Point(s)
Central Tracker Support Mounts	Kinematic Mounts		6		IPC End Support to Calorimeter

Silicon Tracker Interfaces					
Facility Interface	Type	Size	Qty	Material	To/From
Si Read Out Data Readout Clock/Trigger	Fiber Optic	12.5 mm diam/ 32 FO Bundle (5052 FO = 158 Bundles)	158	Fused Silica	Electronic Room to Si Tracker MCM chip
Si Tracker Power/Signal Cabling • Bias Voltage • Low Voltage Power • Slow Control System • Test Signal • Remote Control • Temperature Sensors • Calibration Cables	Conventional Electrical Cables (could be co-axial or twisted pair outside Central Tracker)	1.2 cm X .425 cm	192	Kapton Insulator with copper of aluminum metal	Counting Room to Si Tracker Endcap
Si Tracker Alignment Monitoring System	Fiber Optic	1.12 mm diam./ bundle	5	Fused Silica	Si Tracker Shell to Electronics Room (Si Tracker Alignment Monitoring System)

Silicon Tracker Interfaces (Continued)					
Facility Interface	Type	Size	Qty	Material	To/From
Si Tracker Bonding	Electrical Bonding Straps	TBD	TBD	Aluminum or Copper (?)	Si Tracker to Calorimeter or Central Support Ground Attach Point(s)
Si Tracker Support Mounts	Kinematic Mounts		6		Si Tracker Space Frame to IPC End Support
Silicon Tracker Cooling System	Liquid Butane Supply Lines + Butane Vapor Return Lines + Cooled Nitrogen Supply Line	(Coaxial Coolant Lines)	16		Gas Mixing Room to Si Tracker Endcap Ass'y
	Common Butane Vapor Vent Line		1		Si Tracker Cooling System to Surface
	Common Nitrogen Vapor Vent Line		1		Si Tracker Inerting System to Surface
	Safety Relief Valve Line - Butane		1		Si Tracker Cooling System to Surface
	Safety Relief Valve Line - Nitrogen		1		Si Tracker Inerting System to Surface
	Instrument Air Supply/ Return Line		4		Instrument Air Manifold to Valves V39 & V37