

TOB Plans for the MTCC

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Outline

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- TOB Concept
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- Conclusion

Introduction:

- I'm permanent scientific staff at Fermilab
- I was a project leader for the ISL at CDF

(joined in 1999 when project was ~same stage as TOB is now... just beginning module production and thinking seriously about final assembly, installation, commissioning, etc.)

- Joe and Duccio asked if I wanted to help with the Magnet Test / Cosmic Challenge (MTCC)
- I said yes ~17 days ago
- Now I'm here giving a talk...

Introduction:

Fermilab is committed to

- designing/fabricating TOB mechanics for MTCC
- delivering TOB_{MTCC} to CERN on time for CC
- coming to CERN to help
 - assemble mechanics
 - install rods
 - install TOB_{MTCC} in TK Dummy Tube
 - install/route first cables from TOB

Then we “hand-off” for testing, integration, etc.

MTCC: Goals

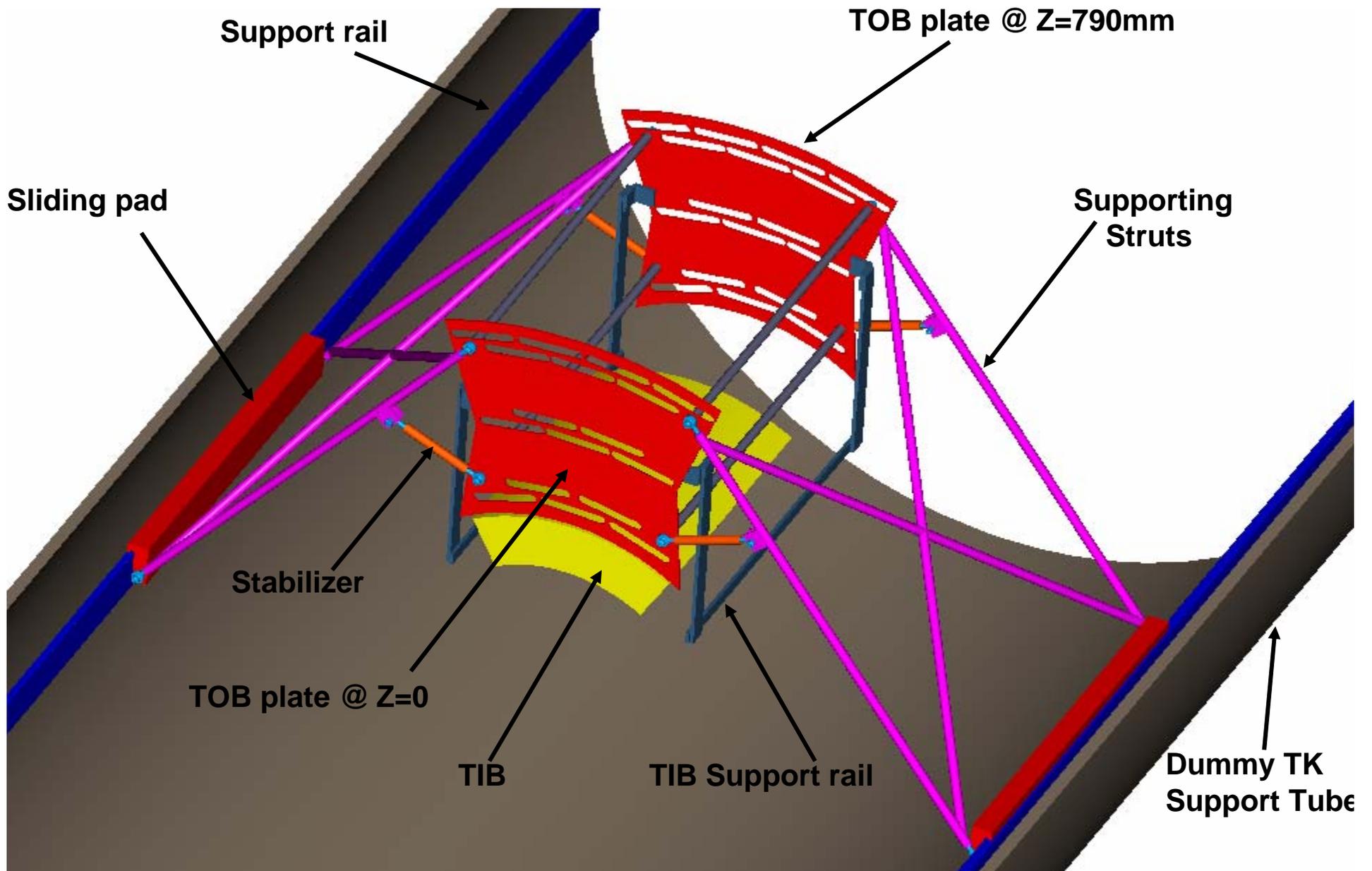
- for CMS:
 - “best opportunity for a combined slice test”
- we might learn something about
 - installation
 - mechanical integration
 - DAQ and trigger integration
 - reconstruction?

MTCC: Limitations

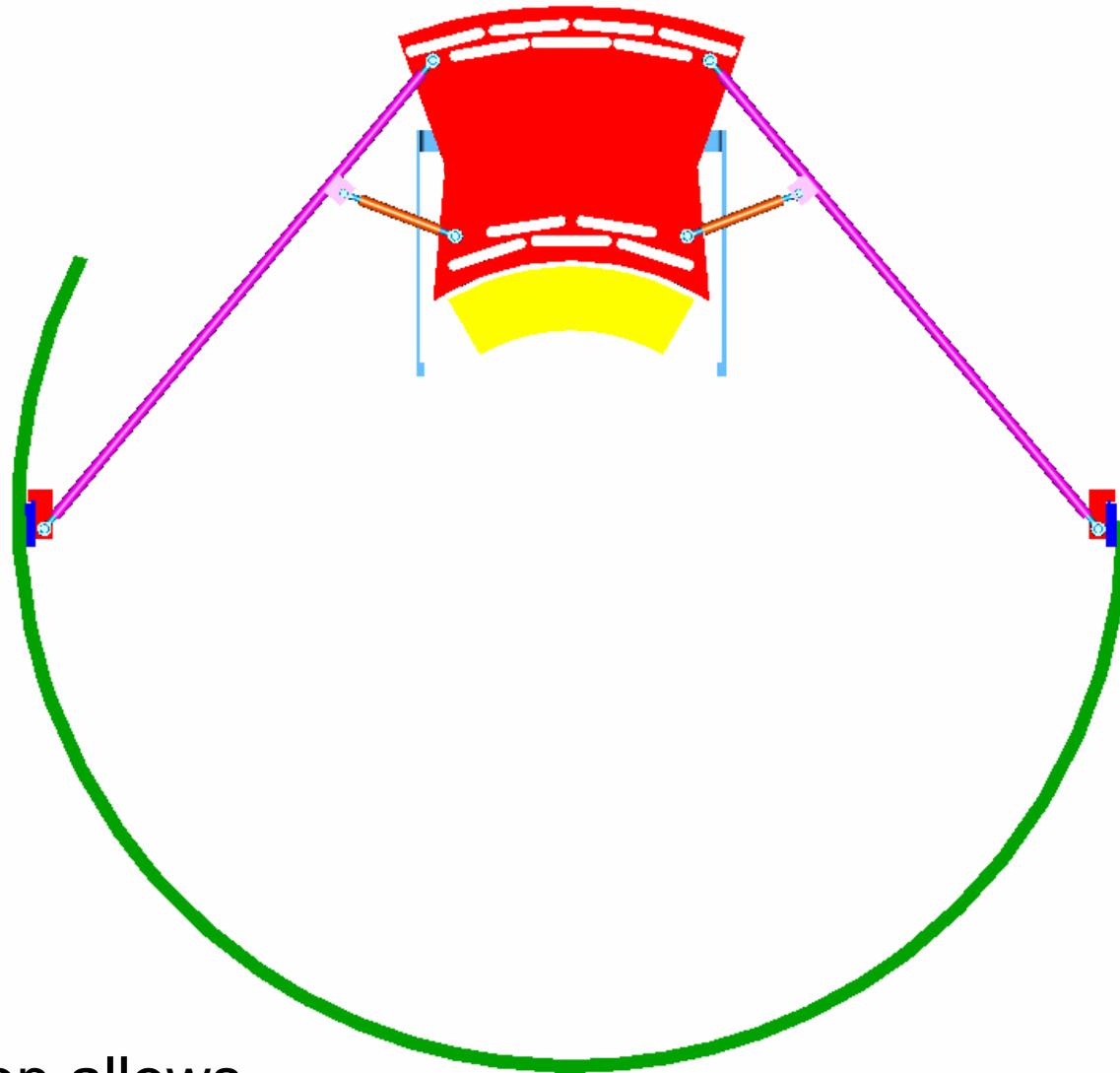
- **MTCC preparations overlap with real TOB assembly** –
 - TK_{MTCC} assembly begins this fall, TOB ~30% assembled by then
 - limits availability of FED/FEC, etc (only 1-2 control rings available for TOB)
 - limits availability of much expertise
- **only 5-8 rods** (mix of SS4, SS6, and DS tbd)
- **limited trigger coverage**
- **cooling will be 18 deg-C water**
- **schedule is very tight**
 - CC parasitic to MT... if TK is late, too bad
 - no TOB, no TIB

MTCC: Our Strategy

- try to supply something ~simple but “tracking” capable in conjunction with TIB
- borrow/re-use as much as possible from real TOB (e.g. installation chariot and platforms)
- assume 2 Control Rings
- accommodate TIB and their goals/plans whenever possible



This is a conceptual drawing to help seed discussion... *many* details to be worked out



Placement on top allows

- use of installation chariot
- use of installation platforms
- probably slightly better trigger coverage



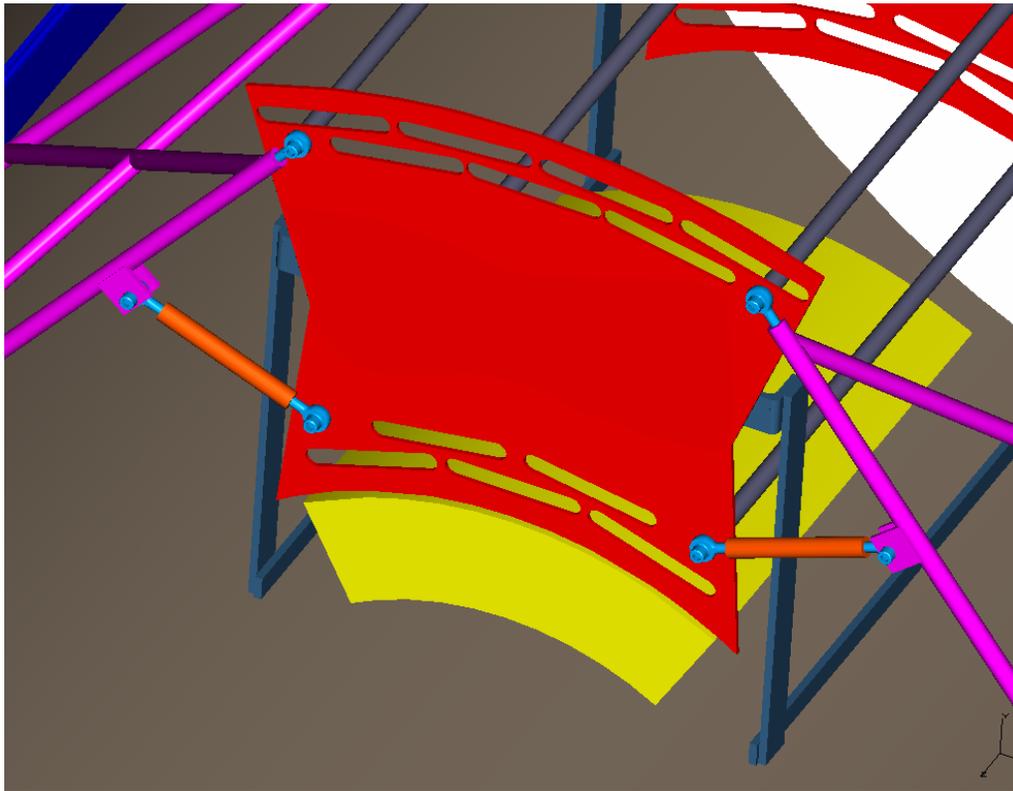
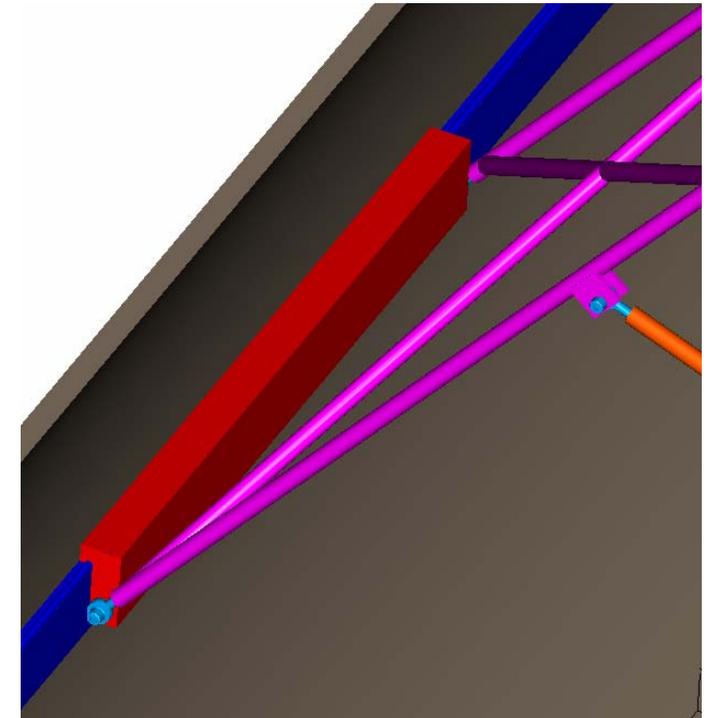


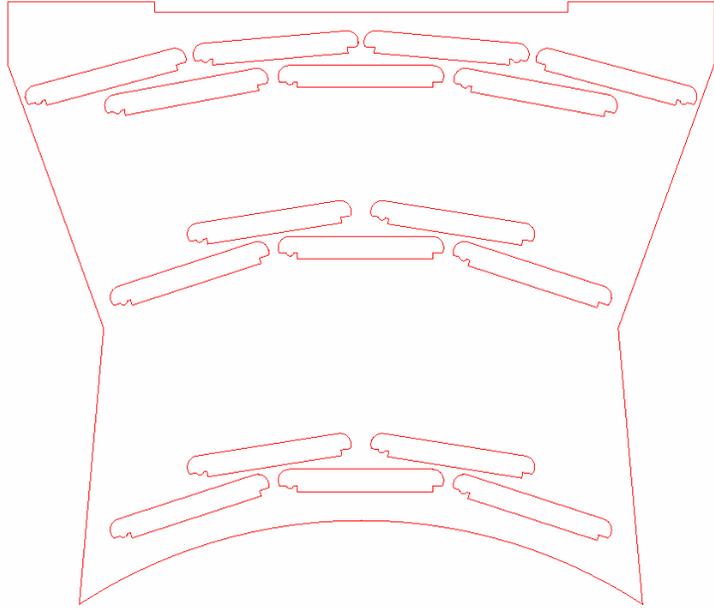
Plate detail

- implies installing rods from end
- propose
 - 4 rods @ $r=L5$
 - 4 rods @ $r=L1$
- use rest of space for manifolds, strain relief

Sliding pad detail

- since only partial slice, worry about lateral forces on rails... modify pads

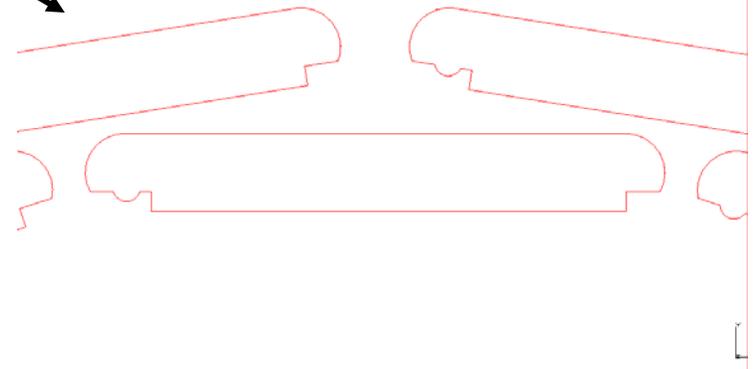
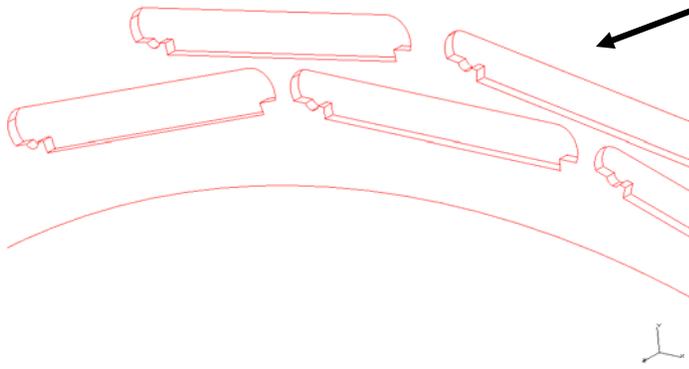




Machined Flats used to achieve the right clocking between the two plates before connecting them with the rods

The plates are 6 mm thick and they will be machined together. The slots will have a groove and a flat to accommodate the rod positioning spheres. One plate will have tapped holes to affix Z-stops (and thus rod) in place.

Slots detail



TOB-MTCC: Schedule

old version: TOB_{MTCC} delivered 27Jun

new version: 1 month slip

Design&Detail	(6wk)	20Mar-01May
Fabricate	(3wk)	02May-22May
Assemble&Test	(3wk)	23May-12Jun
Contingency	(5wk)	13Jun-17Jul
Prepare&Ship	(1wk)	18Jul-24Jul
Arrive CERN		24Jul

Obviously very rough at this point... but with ~40% contingency

Note: Rods will be installed and tested at CERN upon arrival.

TOB-MTCC: Resources at FNAL

Personnel

- lead physicist (DG) 50% FTE
- lead engineer (Stefano Moccia) 50% FTE
- designer and technical staff identified
- discussion w/ on-site machine shop begun
 - offers fast fabrication (both plates in 1 wk)
 - some limitations on dimensions of plates

Other

- rods installed at CERN, so only need a granite table for assembly... that has been identified
- it's in a clean room w/ a CMM if we need it

TOB-MTCC: Resources at CERN

- too many to list... we obviously can't do this w/o a lot of help and co-operation from TOB-CERN group
- some assumptions we're making (so far)
 - we'll have space at SX5 that's safe enough to install our rods (don't need much ~5m x 5m)
 - we'll be using existing install chariot/platforms
 - TOB → TK Tube, then into CMS

TOB-MTCC: Concerns

- will be good to have full MTCC responsibility matrix identified... Austin is working on this
 - we'll need some space at SX5 (~5m x 5m)
 - we plan to use installation chariot
(needs careful co-ordination of the 1 TIB/TOB/TEC chariot)
 - we'll need cantelevered platform to cable while in TK Dummy Support Tube
(need to build replica(s) of existing one)
 - details of services need to be specified
- plans for cable strain relief and patch panel for TOB/TIB clash
 - no problem to resolve, but requires some discussion

Conclusions:

- Conceptual design of TOB_{MTCC} well along
- Adequate personnel and space resources secured at FNAL. Still ironing-out CERN specifics.
- We can't be late, so...
- need to begin ironing-out details
 - in my opinion, the biggest schedule risk is “Design&Detail”... the sooner we start the sooner we'll discover unresolved issues
 - while we have received several drawings (thanks Antti!), we need a few more to get started in earnest
- Many TOB/TIB details to be confronted too