

B-LAYER/THERMAL BARRIER UPDATE

30 NOVEMBER, 1999

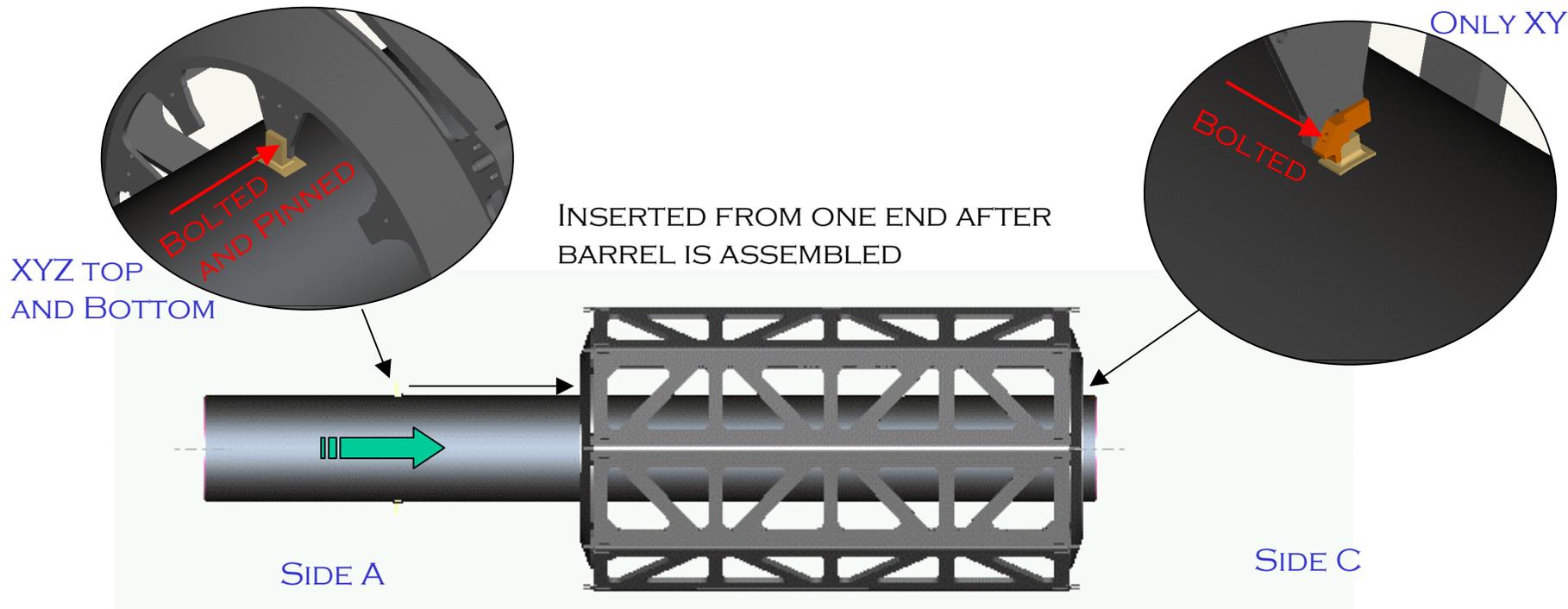
MECHANICS

E. ANDERSEN, LBNL/CERN

REASONS FOR PROPOSAL

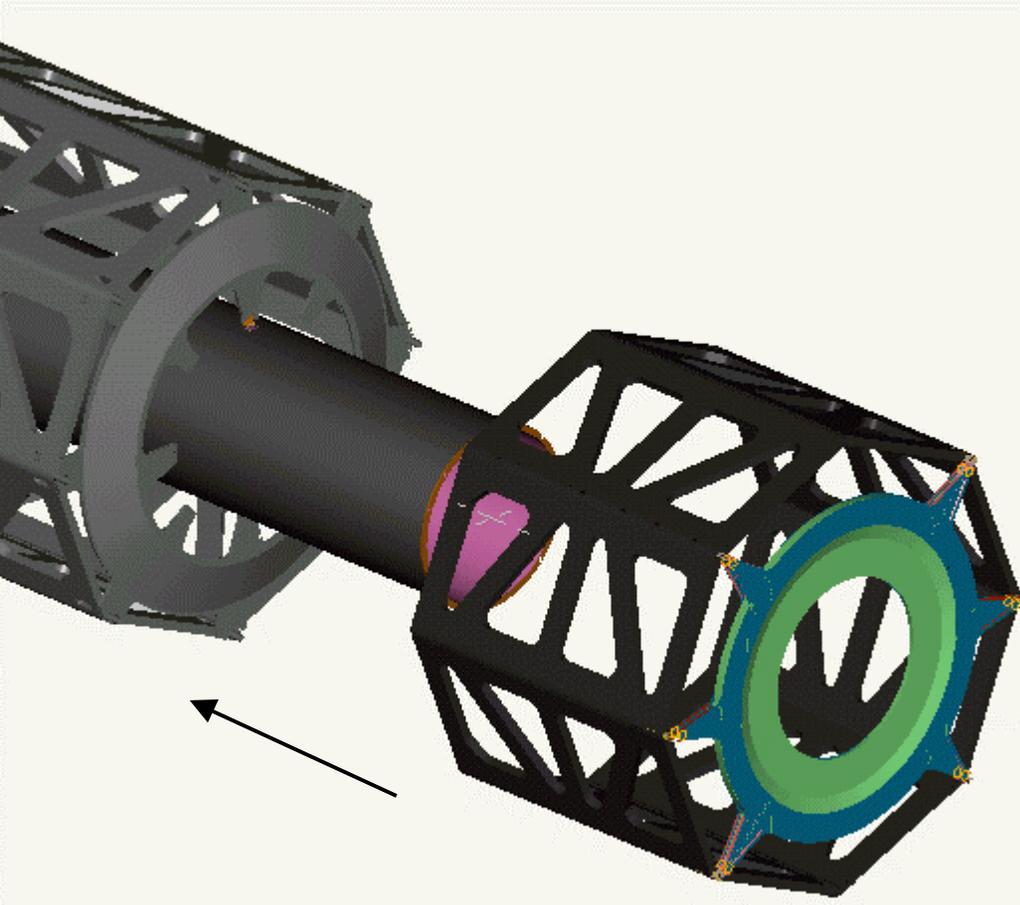
- **ASSEMBLY OF PREVIOUS CONCEPT NOT EASILY SEALED OR SUPPORTED**
 - REQUIRED SEALS WHICH COULD BE DISASSEMBLED AT SUPPORT CONES
 - SUPPORT OF THERMAL BARRIER ILL DEFINED
- **RAIL FOR B-LAYER MOUNTING BENEFITS IN STIFFNESS FROM BEING MOUNTED TO THERMAL BARRIER SHELLS—SLIGHTLY REDUCES OVERALL MASS**
- **INTERFACE OF THERMAL BARRIER WITH END PLATE STIFFENER IS SIMPLIFIED BY DIRECT MOUNTING**
- **WELL DEFINED STRUCTURAL INTERFACE TO GLOBAL SUPPORT FRAME**
- **PROVIDES DE-COUPLING OF B-LAYER MECHANICAL DESIGN FROM GLOBAL SUPPORT FRAME**

MODIFICATION TO PREVIOUS PROPOSAL



- **CHANGE MOUNTING SCHEME FROM THAT PROPOSED LAST TIME TO MOUNTING FROM SUPPORT FINGERS ON BARREL SUPPORT CONE**
- **STILL DIRECTLY MOUNTED TO END PLAT STIFFENERS, HOWEVER LOCATION IS FROM SUPPORT CONE**
- **THERMAL EXPANSION ON ORDER OF ASSEMBLY/BUILD TOLERANCES**

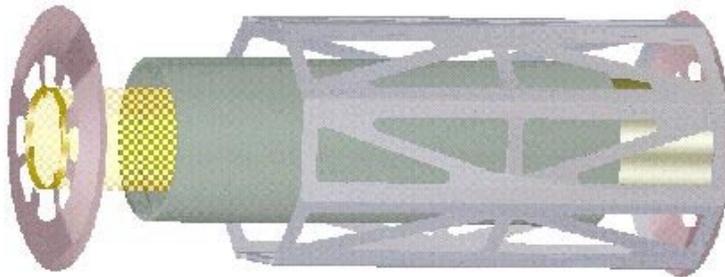
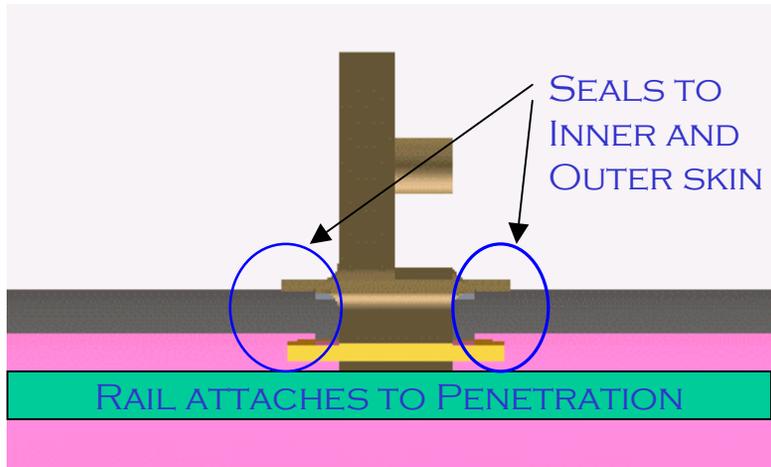
ASSEMBLY OF SUPPORT FRAME



- **BARRIER IS INTEGRATED WITH BARREL REGION**
- **TAKES ALL LOCATION FROM SUPPORT FINGERS**
- **END FRAME IS BROUGHT UP AND BOLTED INTO PLACE**
- **FLANGE ON END OF THERMAL BARRIER BOLTS TO LOOSE HOLES IN END PLATE STIFFENER**
 - ALLOWS END-PLATE TO CONTRIBUTE TO THE STIFFNESS OF THE B-LAYER SUPPORT WITHOUT DETERMINING THE LOCATION

END PLATE STIFFENER IS A USEFUL PART OF END FRAME AS IT BOTH SUPPORTS THE SERVICES AS WELL AS HELPS TO MAKE THE END FRAME SELF SUPPORTING

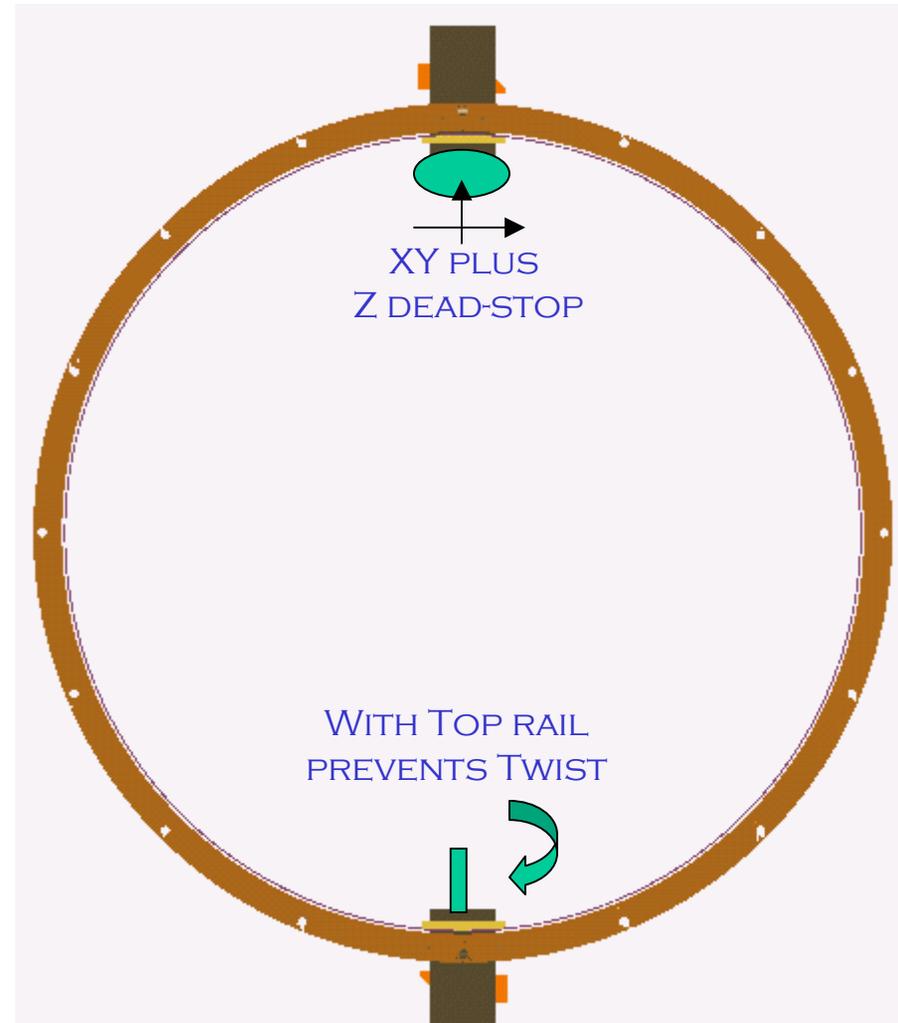
PENETRATION MORE DISCRETE



- **PENETRATIONS ARE NOW SEALED PERMANENTLY**
- **ACT AS RIGID SUPPORT POINTS**
- **LOCATION ON SUPPORT CONES VIA POST-MACHINED FEATURES-
-MACHINED AT SAME TIME AS CONE TO FRAME REGISTRATION FEATURES**
- **PENETRATES THERMAL BARRIER TO CONNECT DIRECTLY TO RAIL**
- **OLD DESIGN REQUIRED DISTENDED SEAL, AND SEVERAL SHELLS**

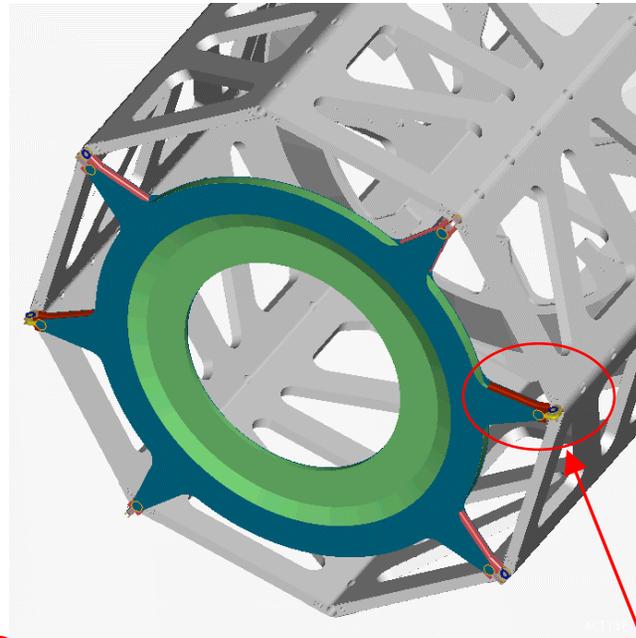
THERMAL BARRIER TO BARREL INTERFACE

- **INSERTED FROM SIDE A**
- **TOP PENETRATIONS SUPPORT RAIL, BOTTOM SUPPORT FIN**
- **RAIL DEFINES POSITION IN XYZ (OR R, Z) (OF B-LAYER)**
- **RAIL + FIN DEFINE PHI**
- **Z, R, PHI FROM CONE SIDE A**
 - PINNED AND BOLTED TOP AND BOTTOM
- **CONE SIDE B DEFINES RADIUS AND ALIGNS WITH Z AXIS.**
 - REGISTRATION SHOULDER AND BOLT TOP
 - BOLTED FLAT (IN R) BOTTOM
- **B-LAYER/RAIL INTERFACE TBD**

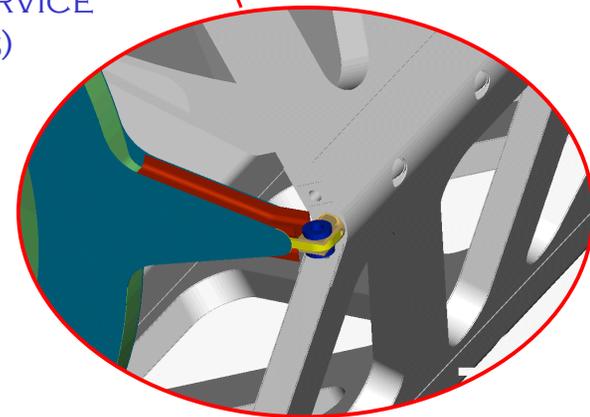


END PLATE STIFFENER INTERFACE

- **INSERTS IN GLOBAL SUPPORT FRAME AND END PLATE ARE PINNED TOGETHER—HELPS TO HOLD END FRAME ‘ROUND’**
- **THERMAL BARRIER FLANGE BOLTED TO END-PLATE STIFFENER**
- **ATTACHMENT TO ENDPLATE PRIMARILY STRUCTURAL—ALL LOCATION INFORMATION COMES FROM SUPPORT CONES**
 - Z-POSITION IS AN ELASTIC AVERAGE BASED ON TOLERANCE OF ASSEMBLY, AND STIFFNESS OF PARTS

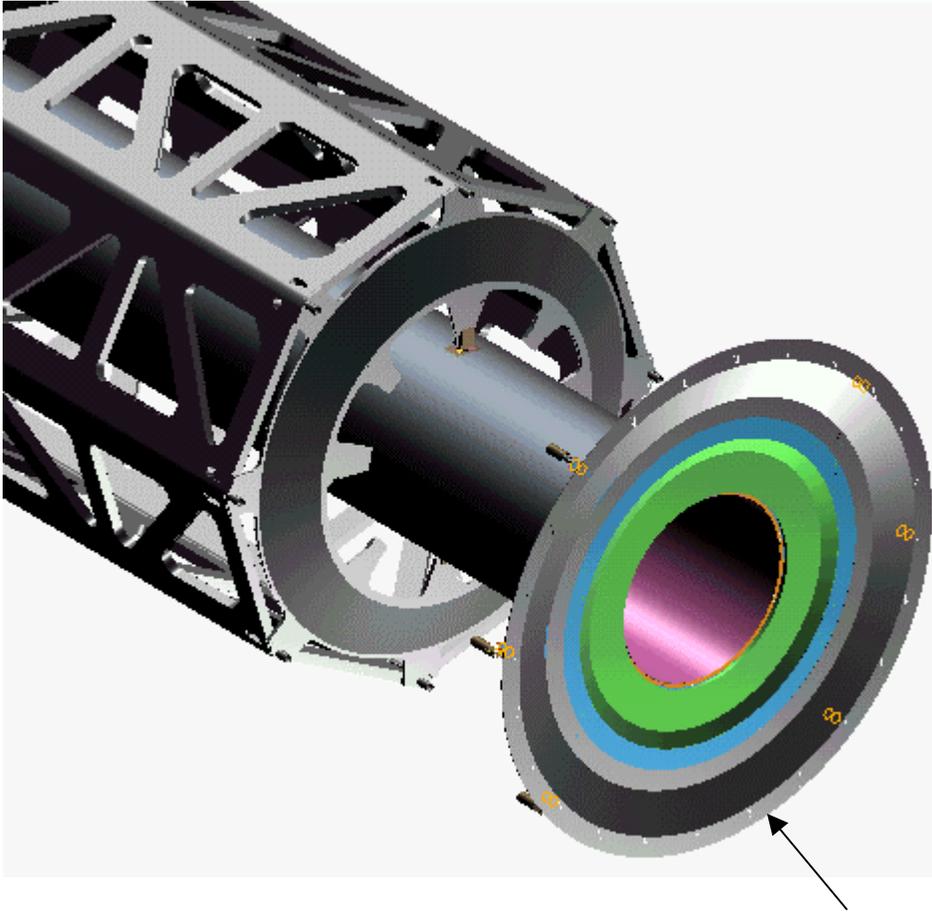


(SHOWN WITHOUT SERVICE INTEGRATION DETAILS)



PIXEL DETECTOR

SERVICE SUPPORT PLATE



- **SERVICE SUPPORT PLATE WILL BE INTEGRATED INTO END PLATE STIFFENER**
- **MOSTLY COSMETIC AT THIS POINT, BUT WILL SEE IF IT CAN SERVE AS PART OF SKIN**
- **SOMETHING IS REQUIRED IN THIS LOCATION TO STRAIN RELIEVE SERVICES JUST AFTER EXITING PIXEL VOLUME, MORE WORK IS NEEDED TO DETERMINE ITS ACTUAL SHAPE**

SERVICE INTEGRATION FLANGE

PIXEL DETECTOR

REMAINING ISSUES

- **NEED TO BRING THIS INTO GLOBAL SUPPORT FRAME SIMULATION**
 - NEW SIMULATION WITH LESS FINGERS SHOULD OCCUR FIRST
 - INDEPENDENT ANALYSIS FOR STIFFNESS WILL BE DONE AT LBNL
- **NEED TO TAKE FIRST CUT AT DESIGN OF NEW B-LAYER**
 - INTERFACE TO RAIL, AND ASSEMBLY SEQUENCE-PROPOSE FOR NEXT TIME-LBNL
 - B-LAYER BARREL SHELL SHOULD BE UPDATED FOR NEW STAVE COUNT OR NEW LAYOUT
- **NEED TO START SIMULATING THERMAL PERFORMANCE OF BARRIER**
 - HEATER PATTERN DENSITY AS FUNCTION OF POSITION
- **INTERFACE OF END-PLATE STIFFENER WITH SERVICES**
 - BRING SERVICE BUNDLES TO END OF FRAME AND NEGOTIATE TURN INTO GAP
- **INTERFACE OF RAIL WITH FORWARD SCT THERMAL BARRIER**
 - RAIL DESIGN NEEDS TO BE PROPOSED TO SCT ENGINEERS