

What we understand SVT will look like

SVT Workfest at Stonybrook University 10 July 2025

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Function, Envelopes

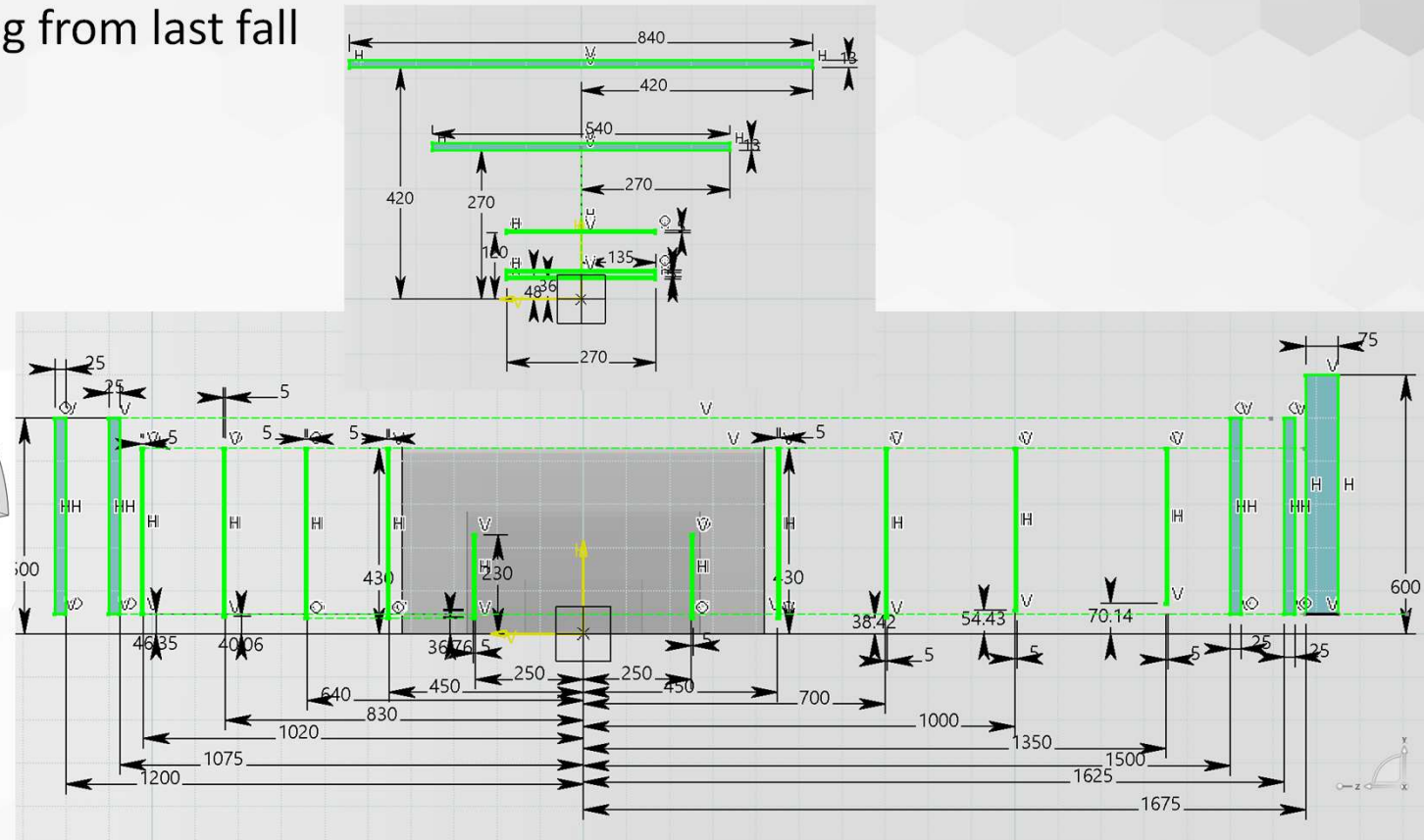
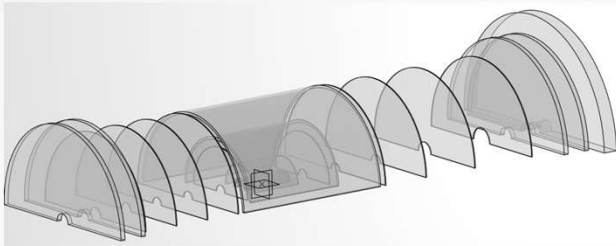
Model update tracking, sharing

Minimize Redundant Information

- <https://wiki.bnl.gov/EPIC>
- And specifically
- https://wiki.bnl.gov/EPIC/index.php?title=Si_Vertex_Tracker
- I, at least, need to spend more time seeking information from the existing wiki and requesting or making updates as needed
- Who can edit currently?

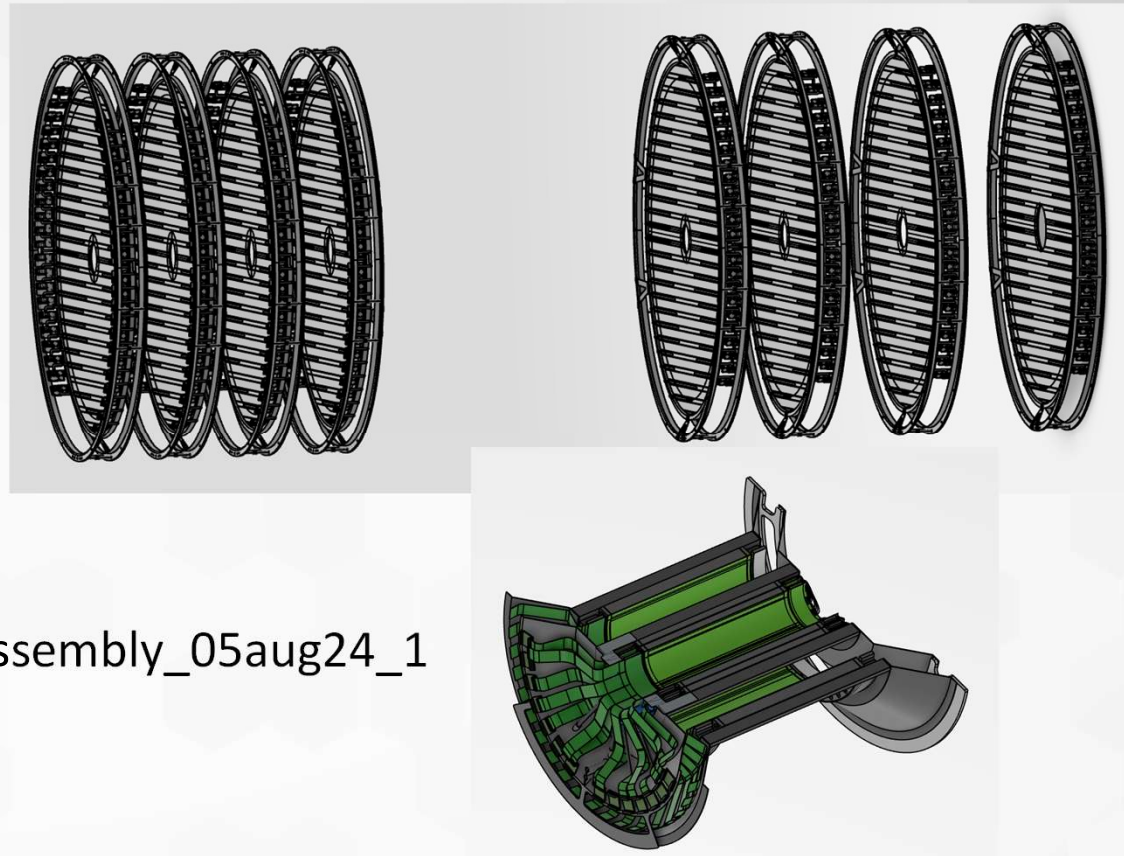
SVT Generic Model

- Based on 2D drawing from last fall



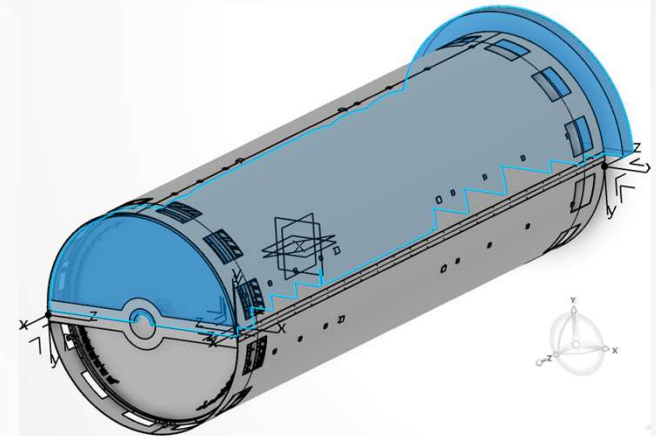
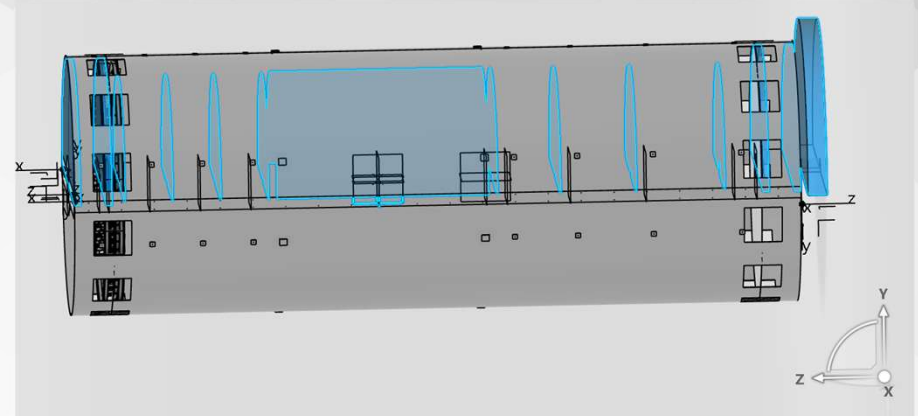
SVT Detailed Models

- As old as last Fall, uncertain origin
- Disk model EC-1003-4694_ASM
 - Includes carrier rings
- Inner barrel model ePic_SVT_IB_Assembly_05aug24_1



SVT Support Tube (PST)

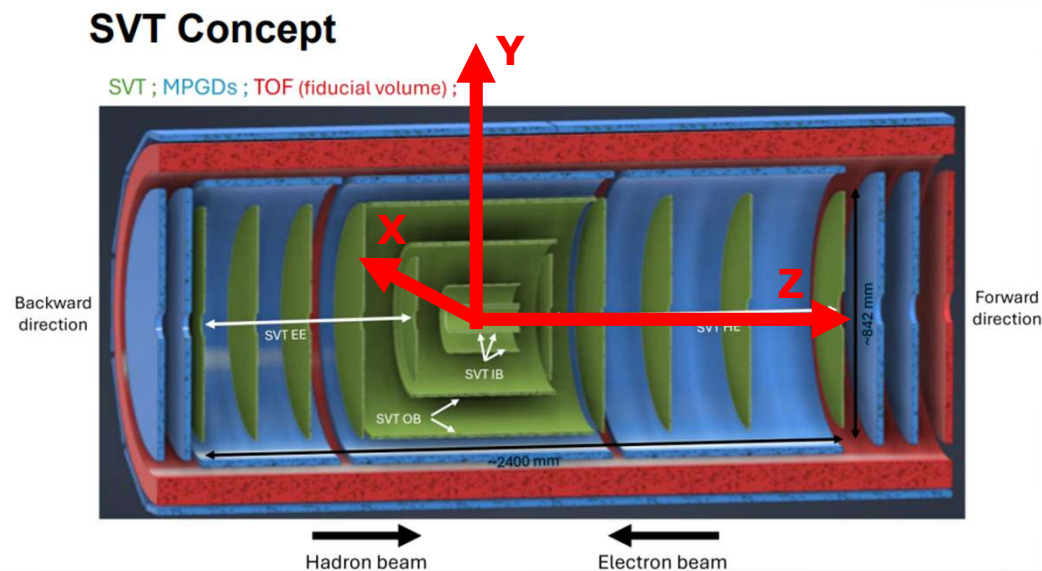
- ◆ Holds, with internal interfaces
 - ◆ SVT barrel and disks
 - ◆ MPGD Disks
 - ◆ Beampipe
- ◆ Supported by
 - ◆ GST Rails at each end via removable brackets
- ◆ Current Nominal Design
 - ◆ Inner diameter 1026mm (R513mm)
 - ◆ Outer diameter of tube 1030mm (R515mm)
 - ◆ (Inside MPGD cymbal, R550mm (use 540?))
 - ◆ Length 2875mm. Stops at MPGD disk ends, $Z = [-1650, +1225]$ mm



Global Model Coordinate System

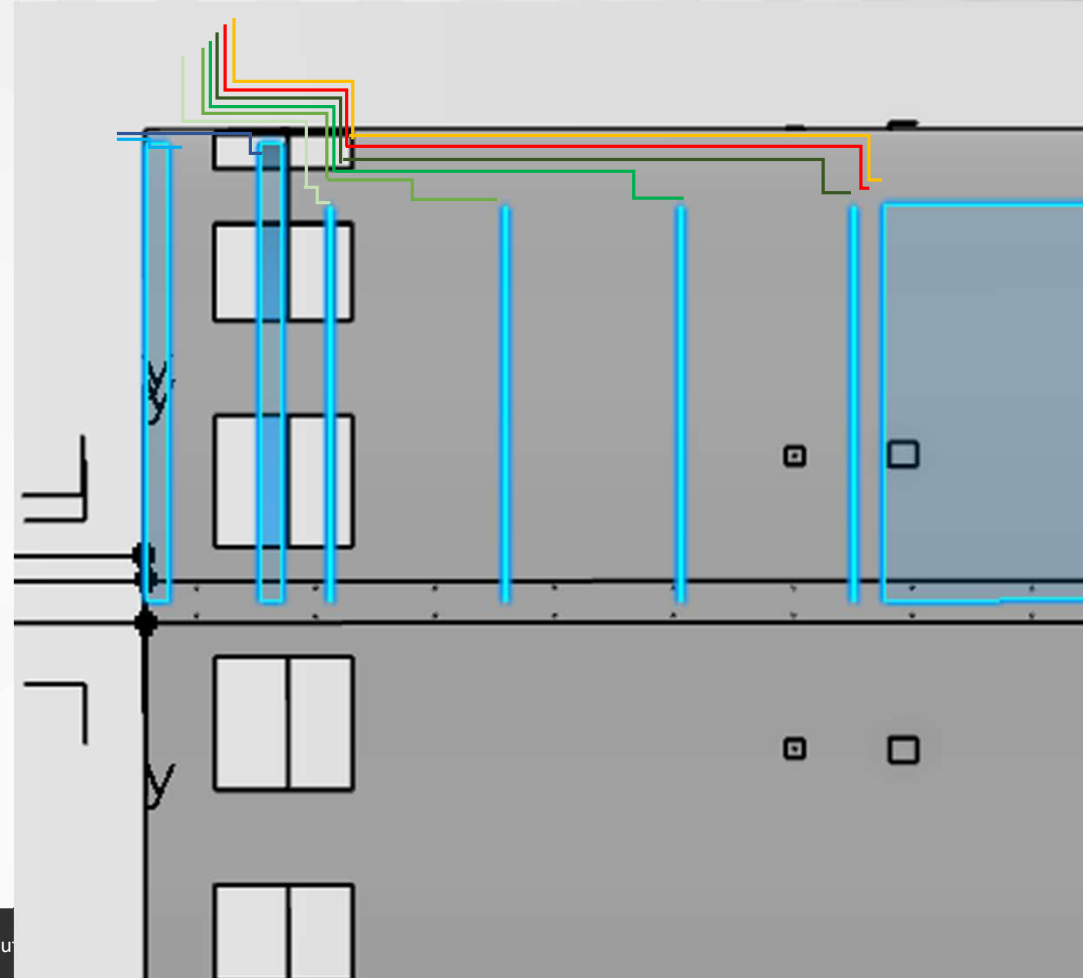
- https://www.epic-eic.org/detector/detector_integration.html
- y-axis pointing to the sky
- x-axis pointing to the ring center
- z-axis pointing along the ring **in the direction of the hadron beam***
- The origin (0,0,0) of this coordinate system is at EIC IP-6.
 - The IP is in the EIC detector coordinate system at $x=0$, $y=0$, and $z=0$
- Number circular arrayed geometries consecutively from X+ axis toward Y+ axis

- *NOTE: Seeing the hadron direction below, I might need to change my Z axis direction in models



Service Diagram Sketch

- SVT services stay inside PST until pass through windows at each end, before MPGD disk
 - Pass through size, number, location still WIP
- Air cooling assumed to use same path
- Need thermal “sealed” patch panels
- Aware that services estimates have been up to 120% of available space after exiting PST
 - Space even tighter after exiting near TOF disk
- Assume fan out of services for flattest possible layering, ...
 - BUT depending on exit points from barrel and disks, could be segmented in phi instead



CAD Model Tracking, Updating Proposal

- Multiple CAD systems
 - BNL – AutoDesk AutoCAD, Vault
 - LBL – PTC Creo, Windchill
 - Purdue – Dassault 3DX (CATIA, Abaqus)
 - Only missing Siemens NX! (and others)
- Neutral file format - .stp “step” files
 - Lose some naming, details, but retain part/assembly tree
 - Use project global coordinates!
- Naming convention option – but also there is an **existing naming convention on next slide...**
 - YYYY-MM-DD_ePIC_subsystem_component_description_Institute_LastName
- Need central “release” location
 - Google Drive Folder?
 - Accommodates other file types
 - Easily accessible
 - Transferrable, co-ownership
 - Sharepoint ePIC engineering folder?
 - linked through this page https://wiki.bnl.gov/EPIC/index.php?title=Si_Vertex_Tracker
 - Similar points to above, confirm access
 - Make SVT subfolder, new folder with each snapshot?
 - Vault, Windchill, 3DX
 - Require licenses
 - Convenient for native file formats
- Suggest design snapshot every x (2?) months

Existing Naming Convention

- ◆ Found this document in an email January 2025
- ◆ SVT example for a composite structure assembly would be
 - ◆ EPC-CTR-SVT-SUP-ASM-V01-PST_with_Brackets.stp
- ◆ No date indicated, but versions
- ◆ Numbering would be hard to track if multiple organizations have versions of same structure
- ◆ No owner/institute indicated
- ◆ SO, use this? Hybrid?
- ◆ Is this a bigger question that needs broader adoption, or already has it?

File Naming and Numbering Convention for EPIC Mechanical Files

8/24

The file number is broken down in to 6 parts, the Detector (EPIC), Subsystem Location, Subsystem Type, Component Type, File Type and Document Number. For the number itself, the words are abbreviated to three capitalized characters. For some files, some of the 6 parts may not be applicable and can be dropped from the part number, though this is not preferred. The file names should be the same as the file number with the addition of a short description and the revision for exported file types (PDFs, STPs, etc.).

Example:

EPC-LOC-SUB-COM-TYP-000 - Description.ext

EPC-LOC-SUB-COM-TYP-000-RAA - Description.ext

- EPC – Project Name. (EPIC)
- LOC – Subsystem Location.
 - GLB – Global
 - CTR – Central
 - FWD – Forward
 - BWD – Backward
 - FFW – Far Forward
 - FBW – Far Backward
- SUB – Subsystem Type.
 - ENV – Envelope
 - FAC – Facilities
 - FLX – Flux Return
 - HCL – HCal
 - ECL – ECal
 - MAG – Magnet
 - RCH – RICH
 - DRC – DIRC
 - OMP – Outer MPGD
- COM – Component Type.
 - ACL – AC LGAD
 - IMP – Inner MPGD
 - SVT – SVT
- TYP – File Type.
 - DET – Detector
 - ELC – Electronics
 - CAB – Cables
 - CLG – Cooling
 - GAS – Gas
 - SUP – Support Structure
 - FIX – Fixtures
 - PRO – Prototypes
 - PRT – Part
 - ASM – Assembly
 - MET – Metrology
 - DOC – Documentation
- 000 – Document Number. For each category change the part number starts at 000 and is a sequential numbering. Numbers may be used out of order for clarity.
- RAA – Revision. The revision should be a letter starting with AA for the initial release. For files that are exported, such as PDFs, indicate the version or revision in the file name after the TYP in the document number as V01, V02, RAA, RAB, etc. Use a “V” plus number, starting with V00, for versions prior to release (V01, V02, etc.) and “R” followed by a letter, starting with AA for the initial release, for released files (RAA, RAB, etc.).
- Description. – Every file deserves a description, so that they can be found without the PDM meta data. This is typically the name for the part that goes in the title block. Use descriptive names, avoid duplicate names, and keep file lengths reasonably short.

SVT Model Ownership

Who is responsible for which *models*?

- SVT Inner Barrel Models
 - Structure
 - Sensors, Boards, etc
 - Services
- SVT Outer Barrel Models
 - Structure
 - Sensors, Boards, etc
 - Services
- SVT Disks Models
 - Structure - LBL
 - Sensors, Boards, etc
 - Services
- SVT Barrel “Cones” Models - Purdue?
 - Needs collaboration because carrying services and likely other items
- PST and Connections Models – Purdue
 - PST tube and cutouts for services pass through
 - Barrel to PST brackets
 - Disk to PST brackets
 - Beampipe support
 - Support rail brackets
 - Thermal membrane/seal
 - Except services seals? Or collaborative
- Services routing space, design - ?
 - Inside PST
 - Outside PST

Future Work

- Create simple, easily modifiable envelope models
 - Still a snapshot until services “final”
- Correct all models and sub-models to global coordinate system before sharing
- Get latest models and make a “snapshot” assembly every XX months
 - Email group when updated?
- Agree on shared model repository location
 - Add link to ePIC wiki
- Agree on file/model naming convention

Notes from today

- ...