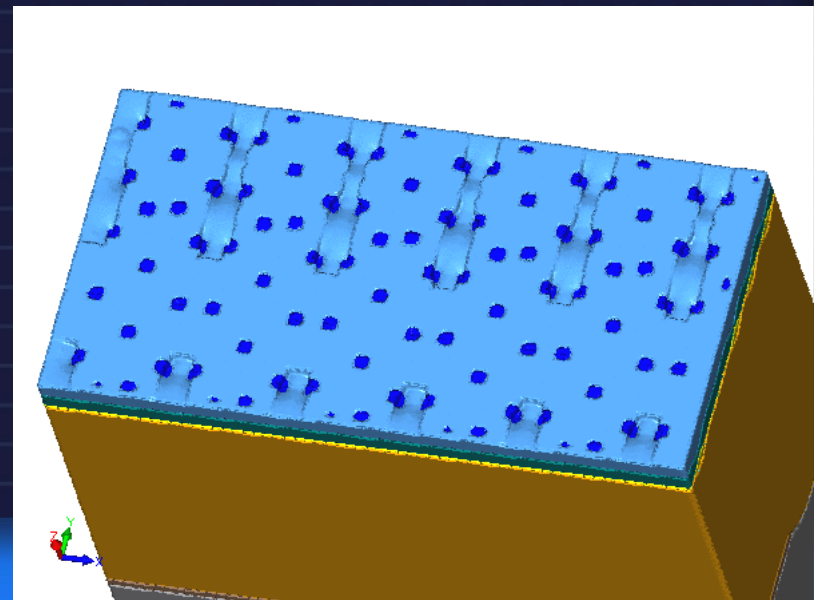
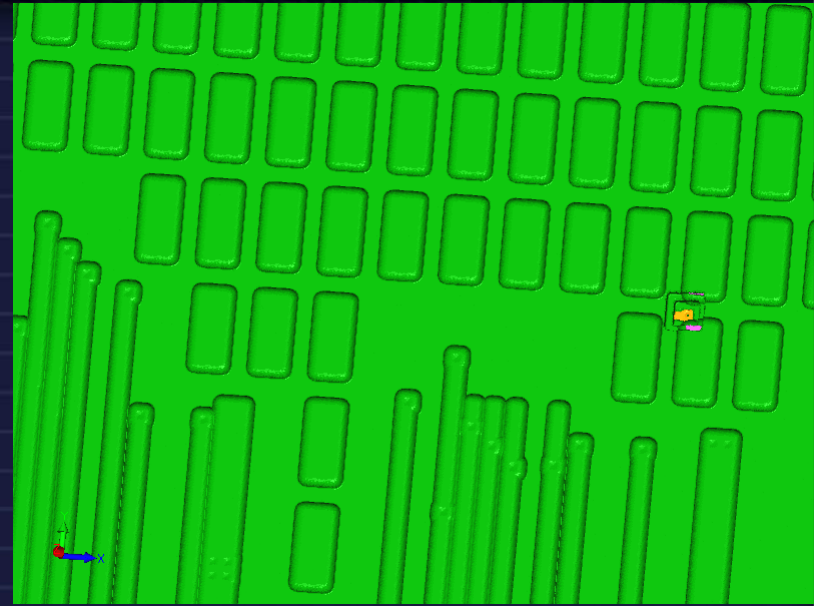
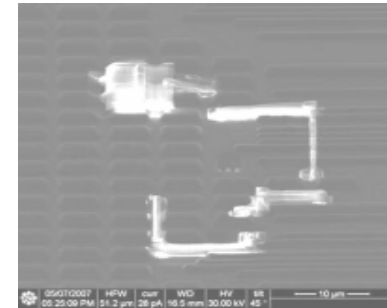
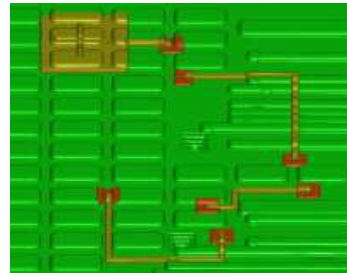


Using SEMulator3D for Circuit Edit Work Planning

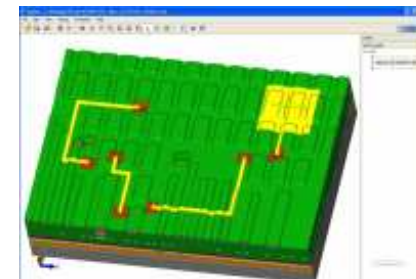
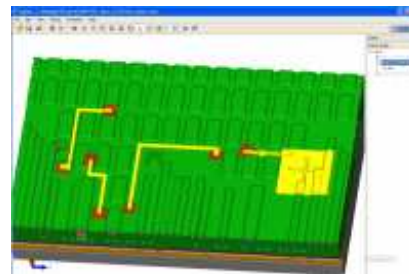
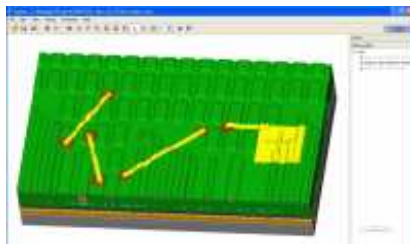
Chris Kennedy
Sr. Product Manager
08-Oct-2007

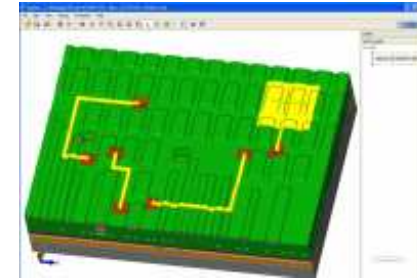
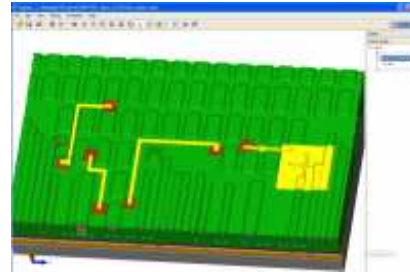
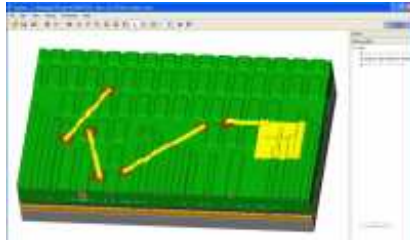


- A Software methodology to plan the step-by-step operations required in a Circuit Edit.

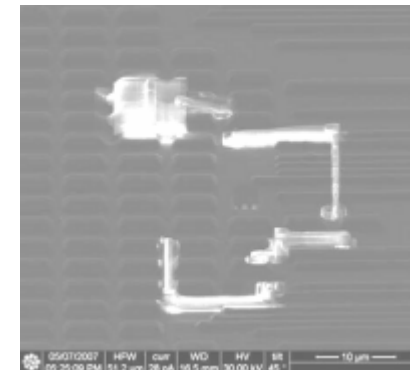
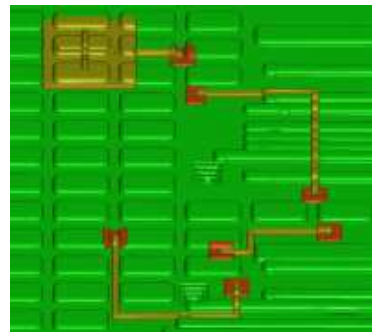
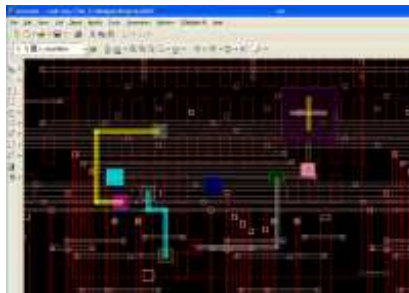


- Multiple candidate plans can be evaluated, and specific instructions for the best one provided to the FIB operator for use.

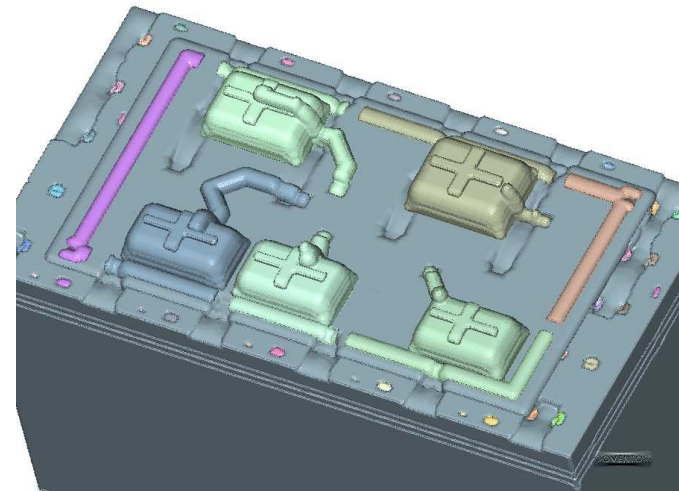
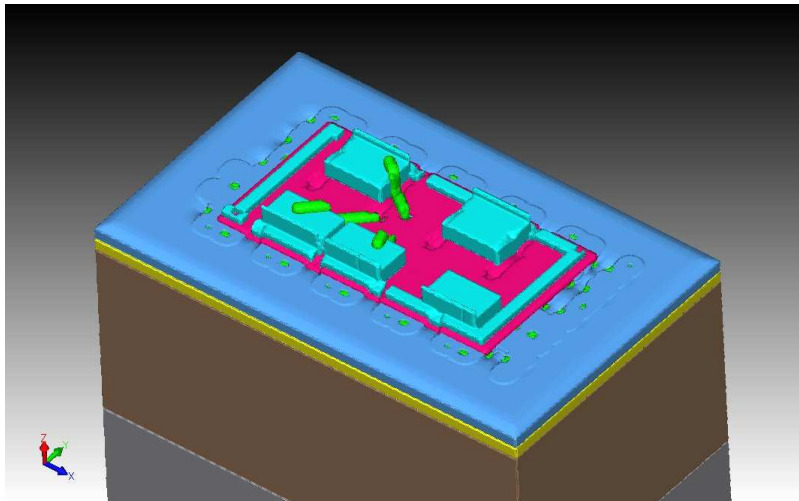




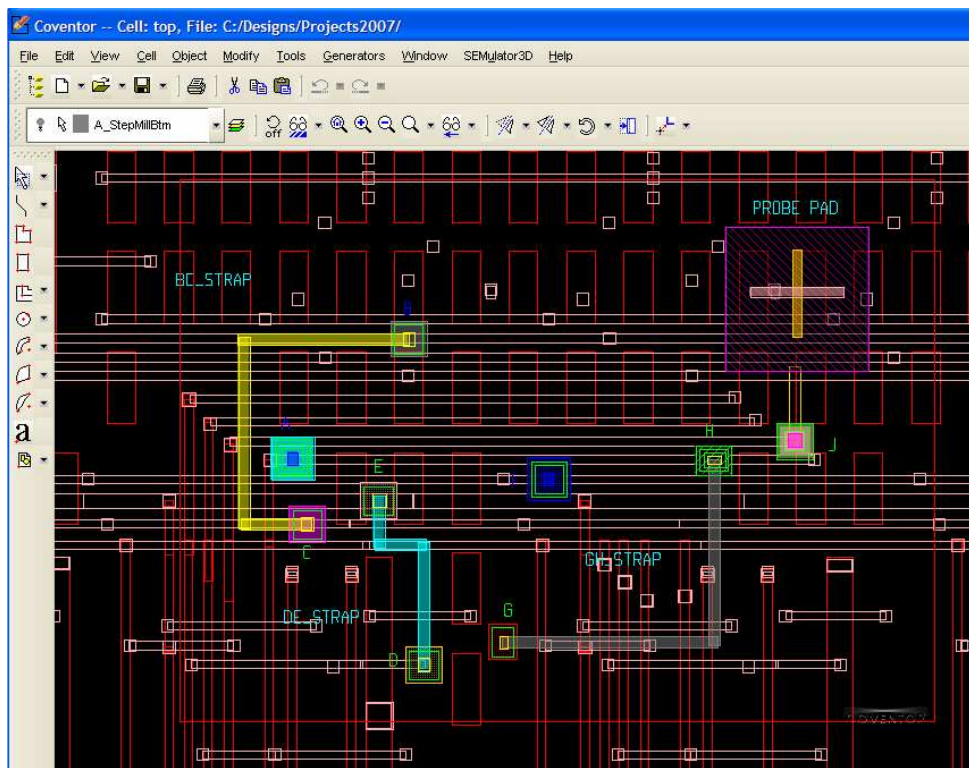
- The virtual CE Work Instructions can then be qualified as an accepted or rejected plan based on success of the Circuit Edit in electrical bench testing.



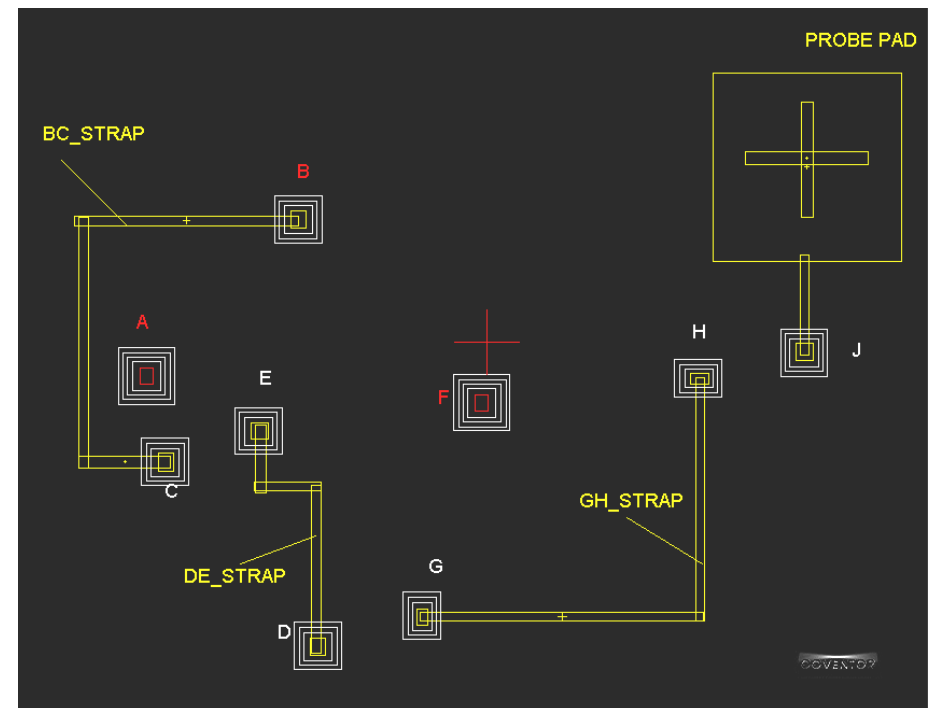
- Deliver a functional device after a Circuit Edit is conducted.
- Maximize Effective “Beam On Time”



- The layout info for the device to be edited is needed in CAD/NAV or GDSII so the CE plan can be created.

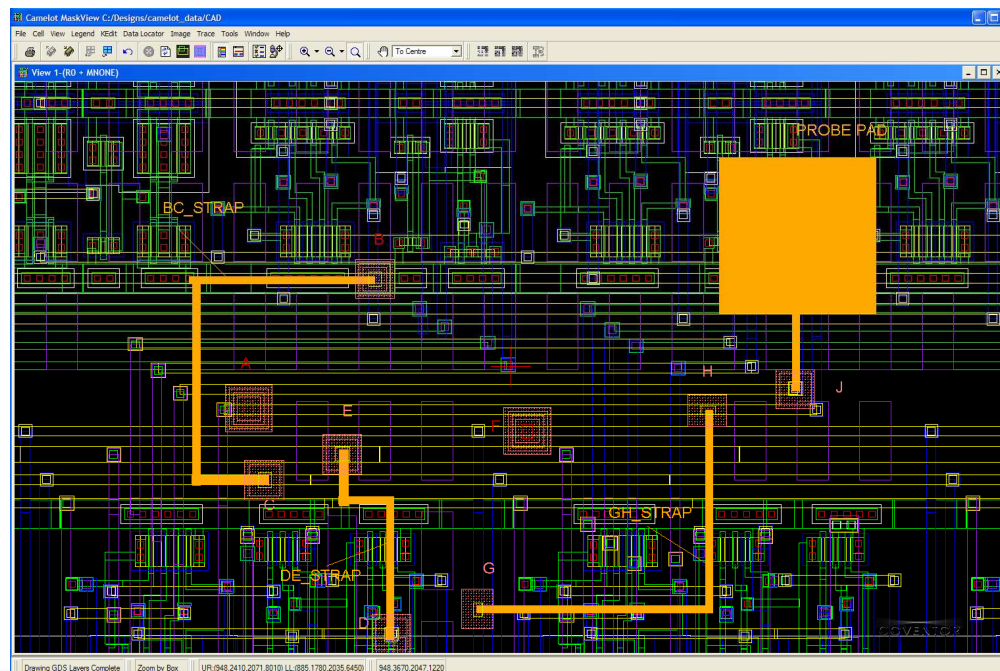


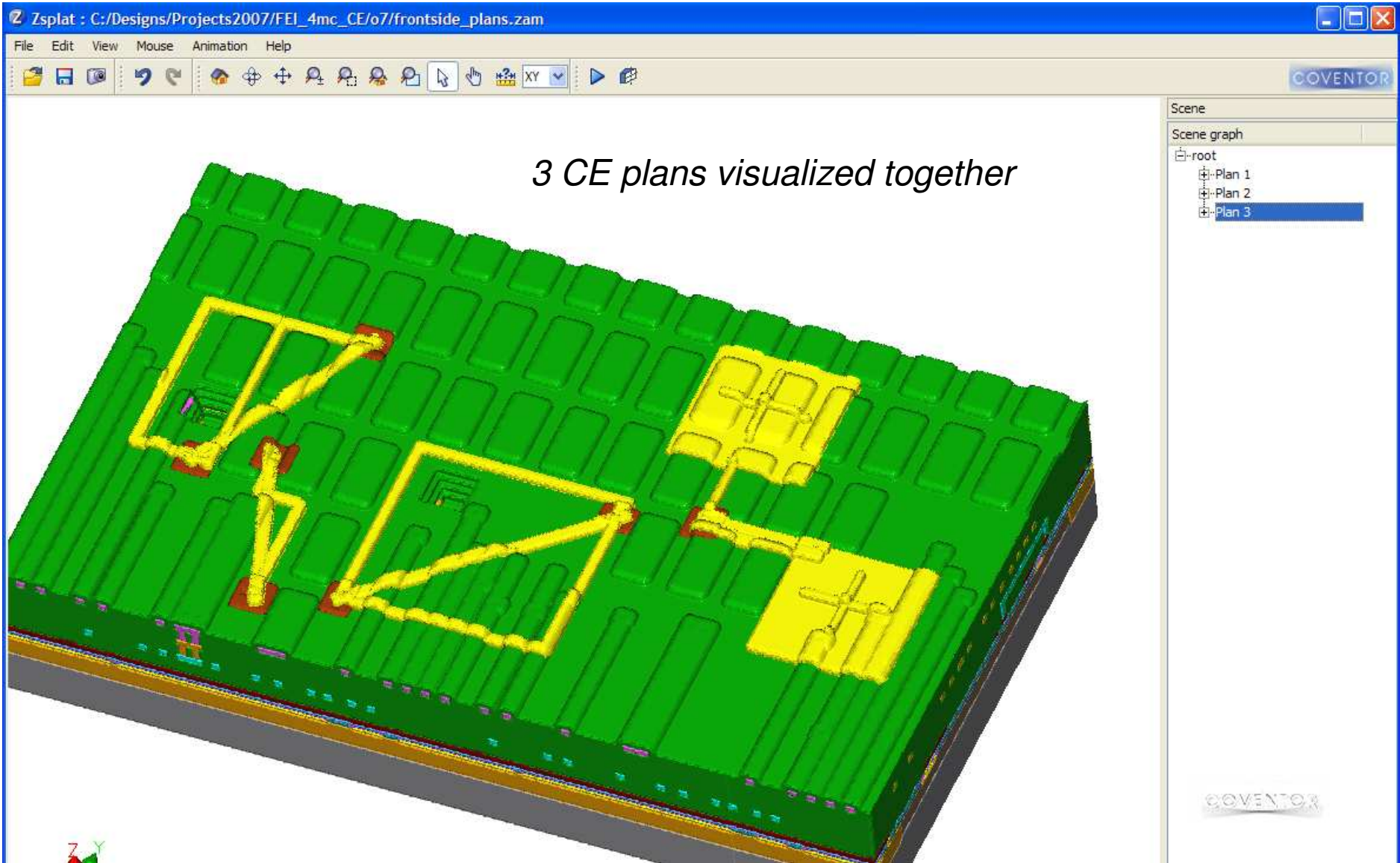
Coventor Layout Editor



KEdit

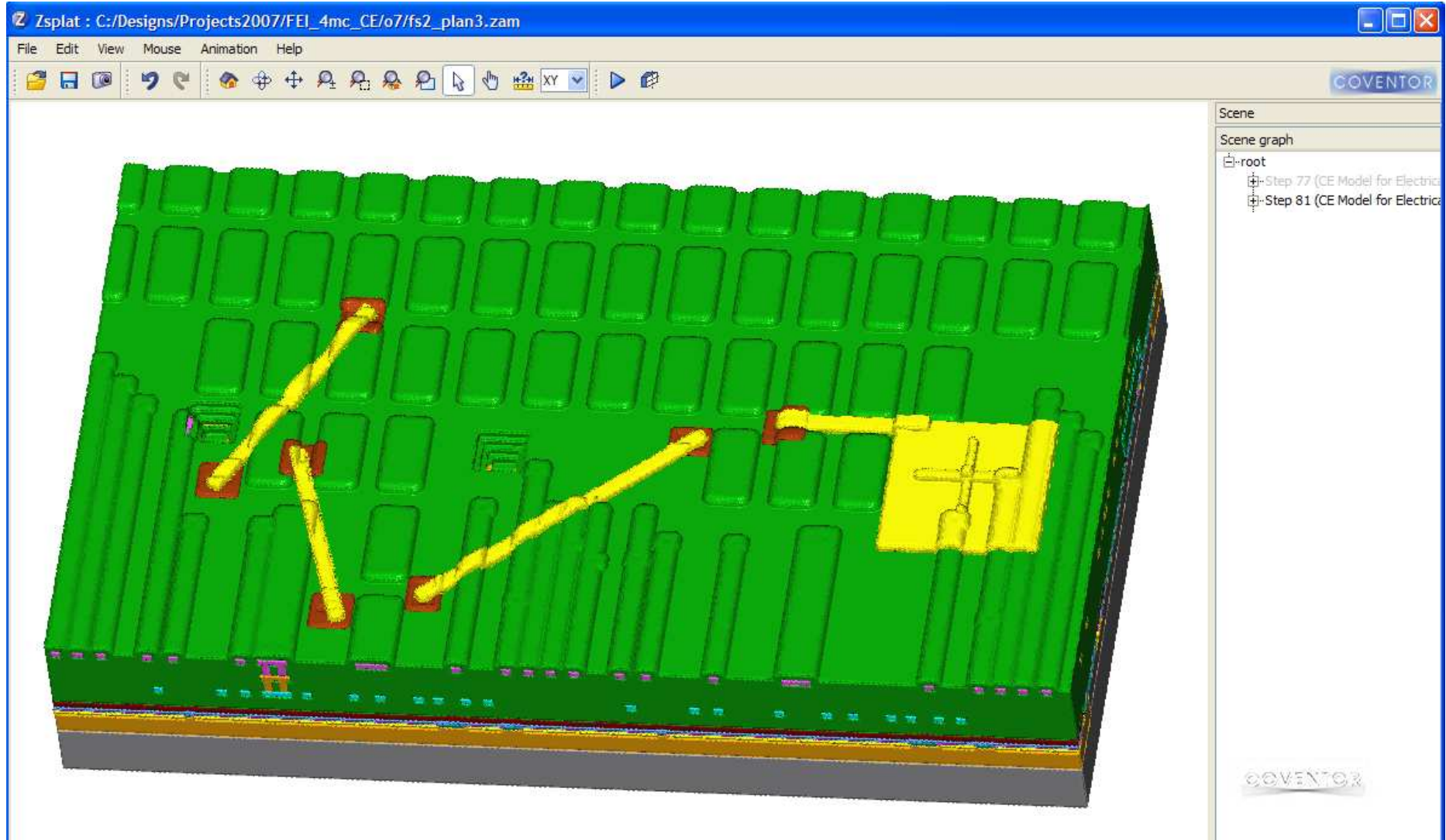
- Knights-Camelot CAD/NAV with the SEMulator3D-Camelot Bridge can be used to provide the layout information.
 - KEdit can also be used to layout the circuit edit.
- KEdit information can be transferred to and from the Coventor Layout Editor

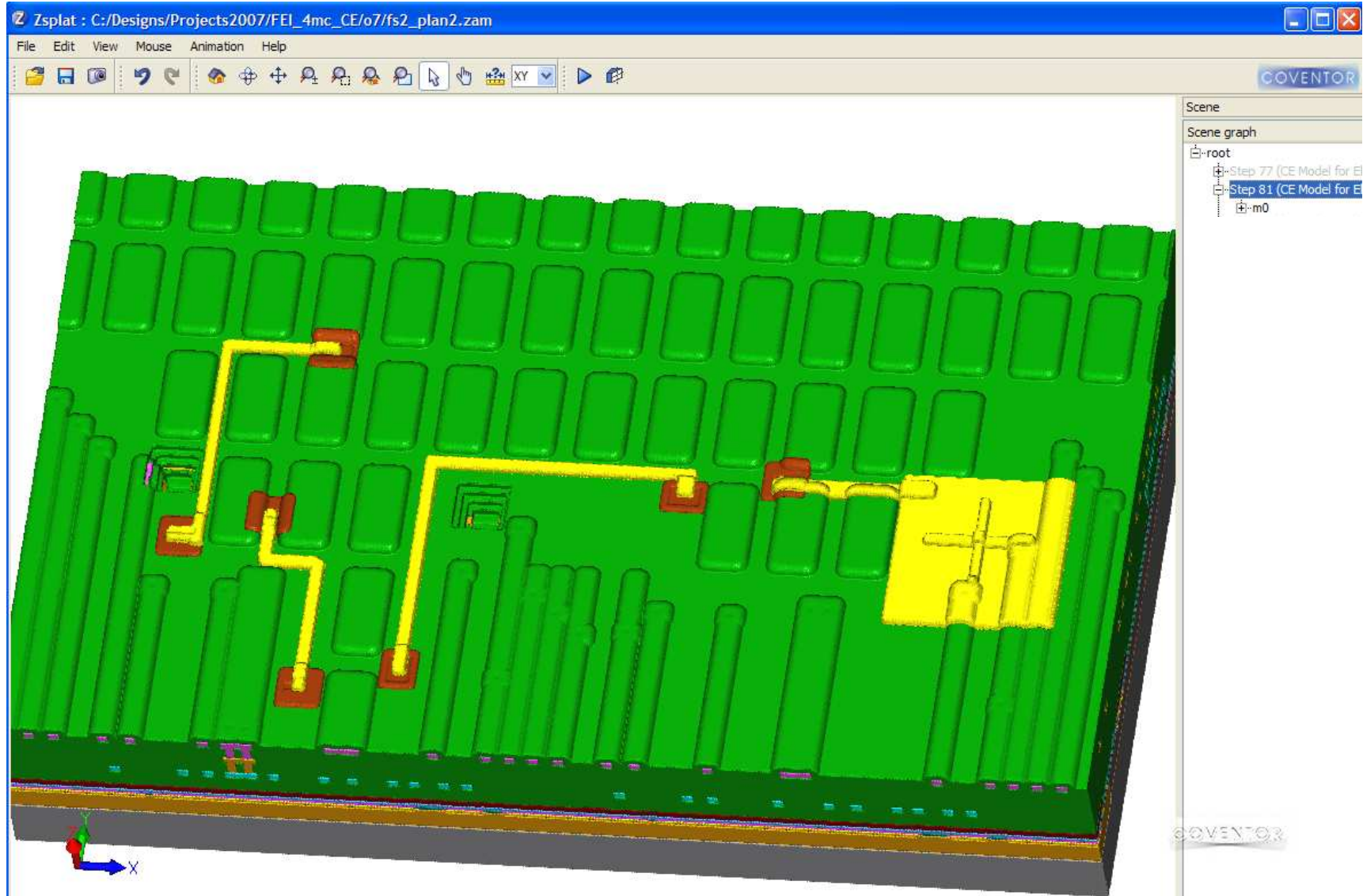


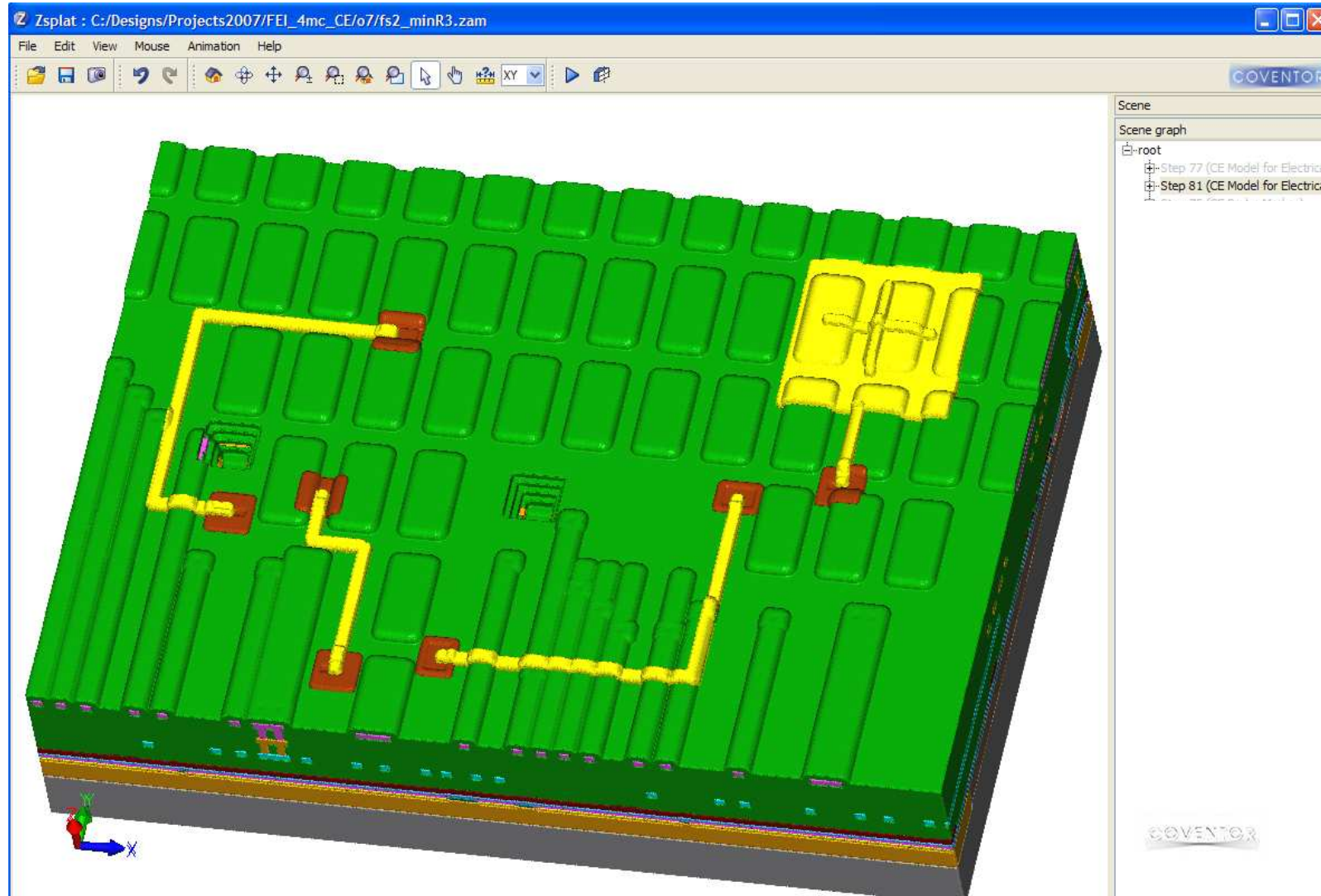


3 CE plans visualized together

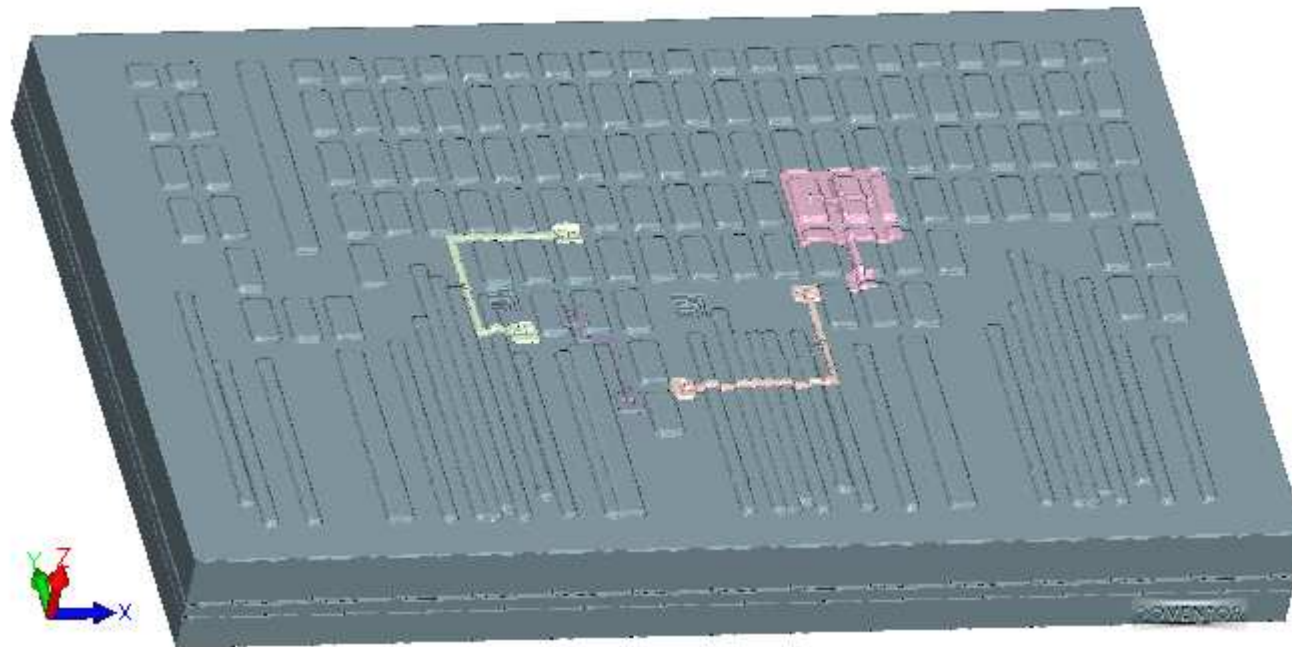




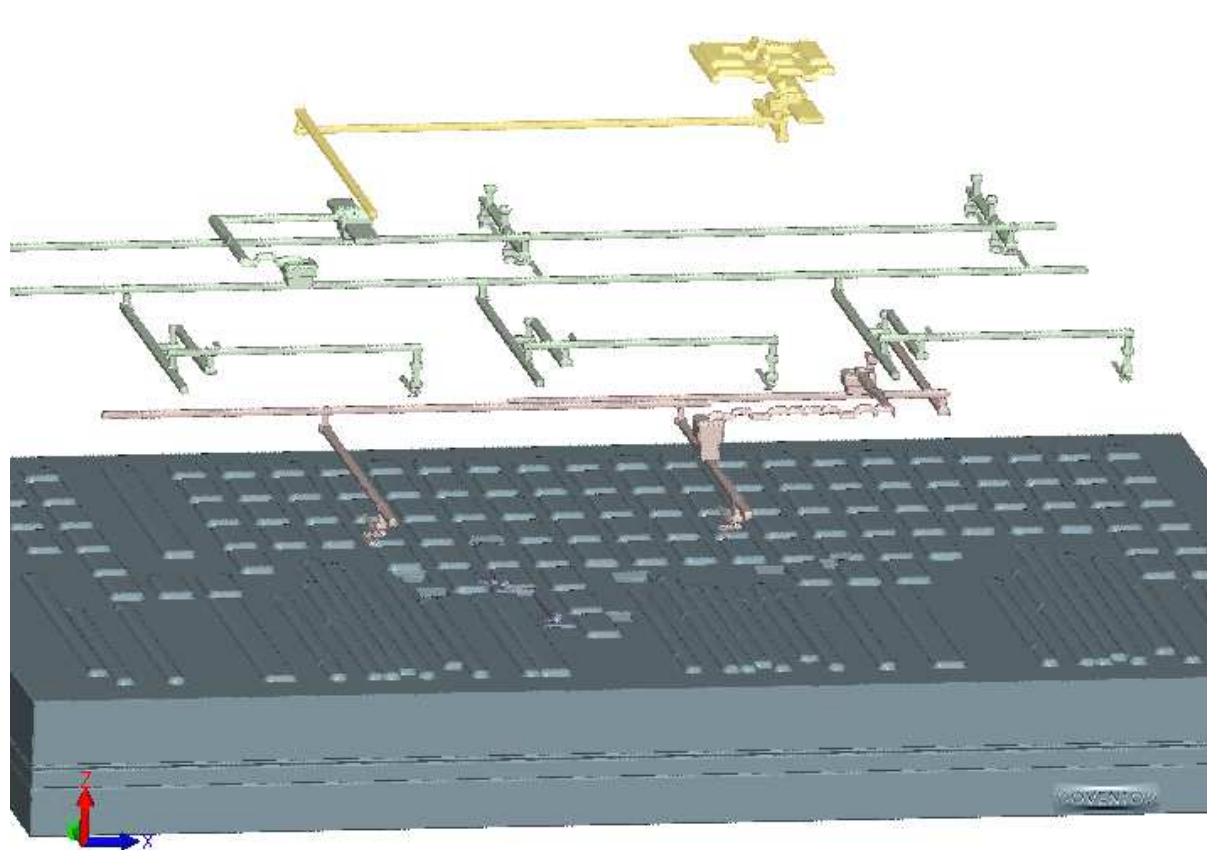




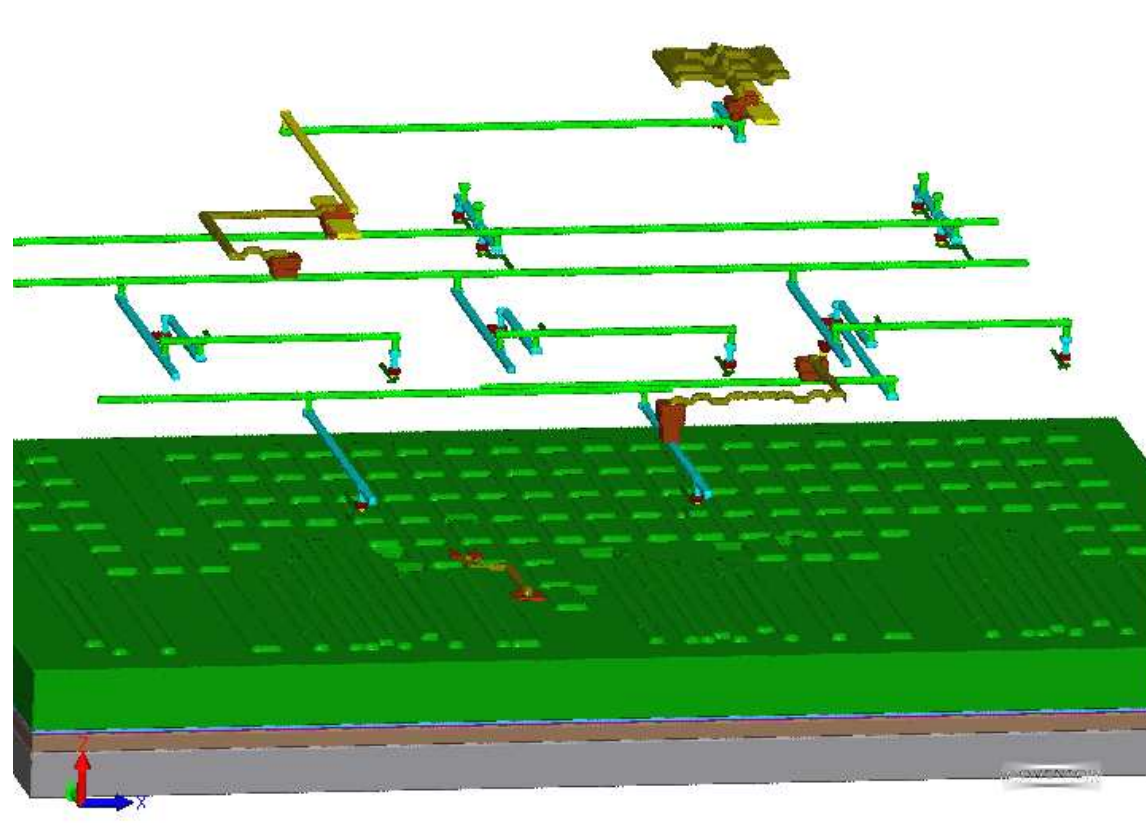
- Validate the new net wiring is correct
- Net connectivity before CE and after CE is available

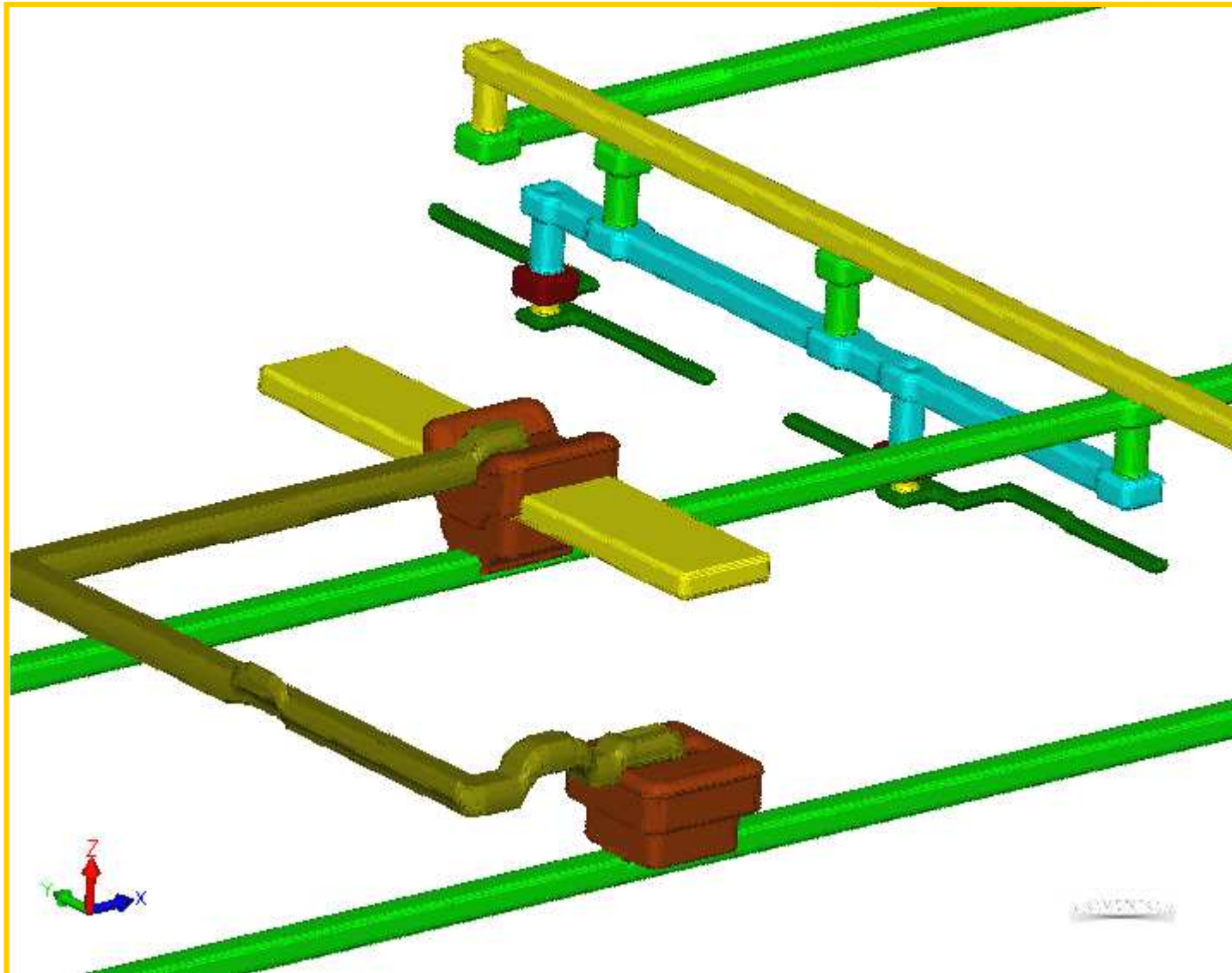


- Validate the new net wiring is correct
- Nets can be 'pulled' out of the model



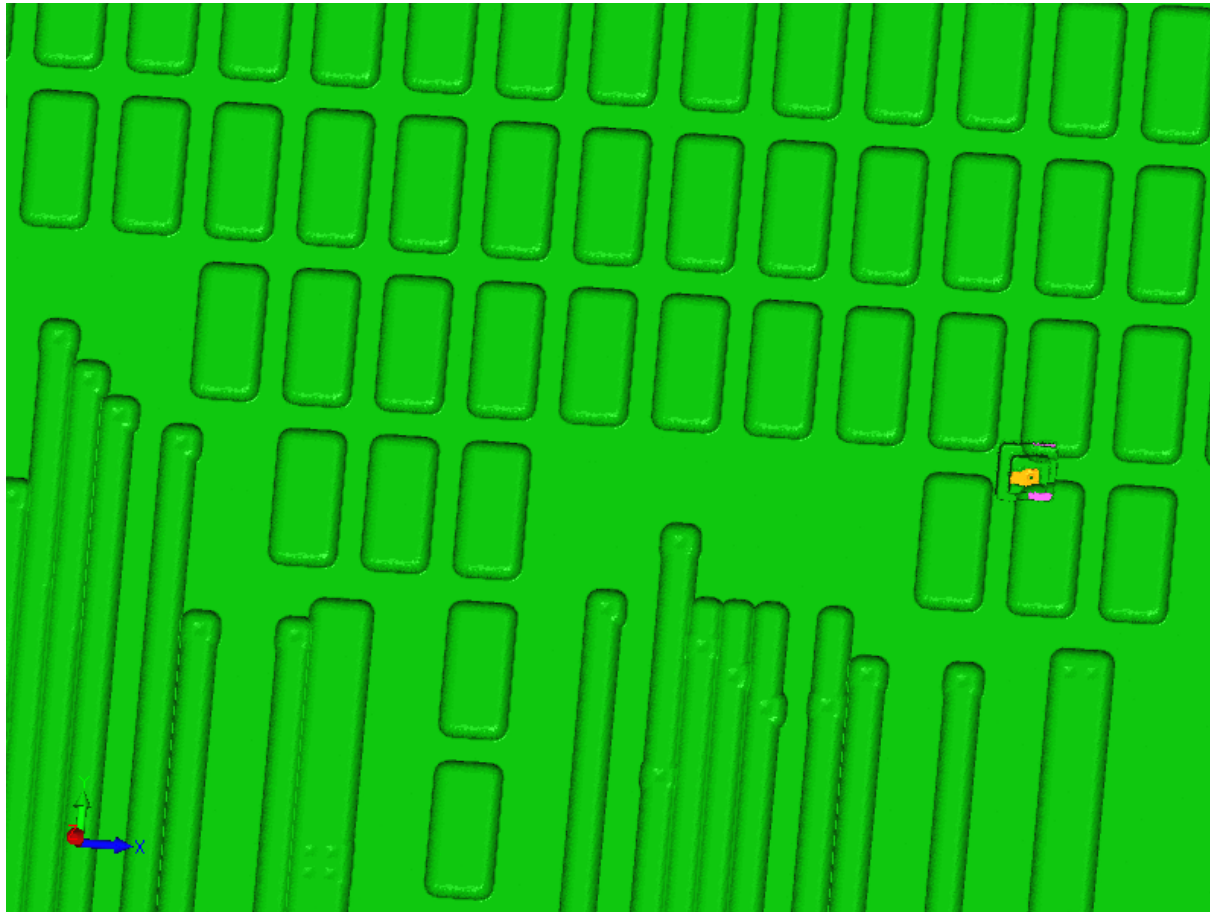
- Validate the new net wiring is correct
- Nets can be viewed by interconnect material



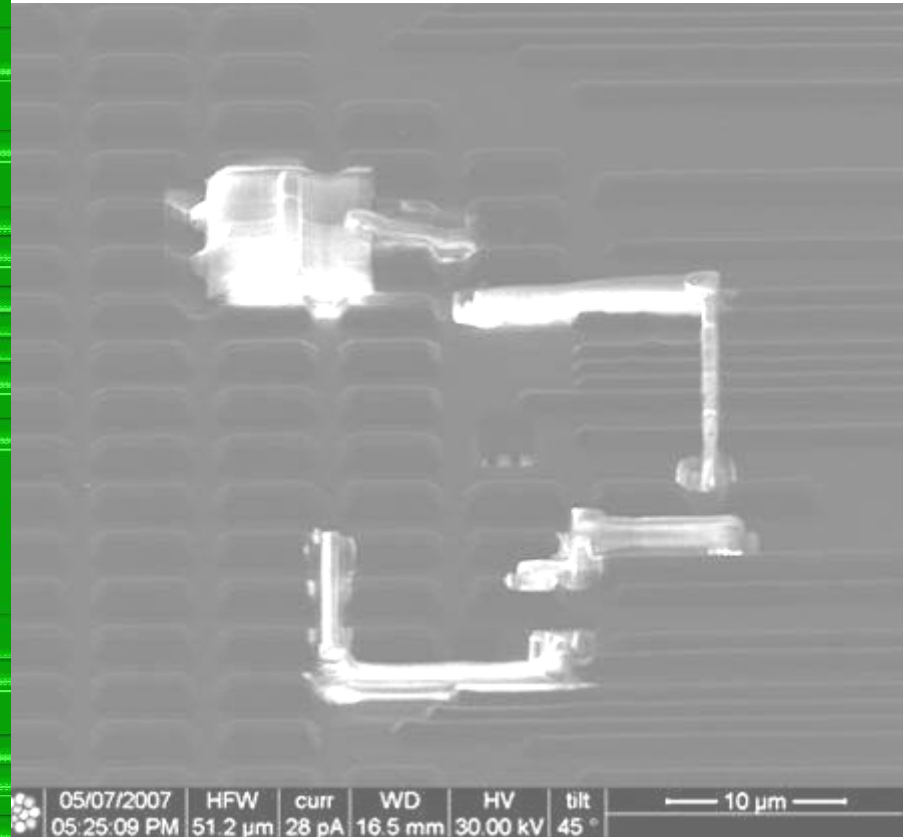
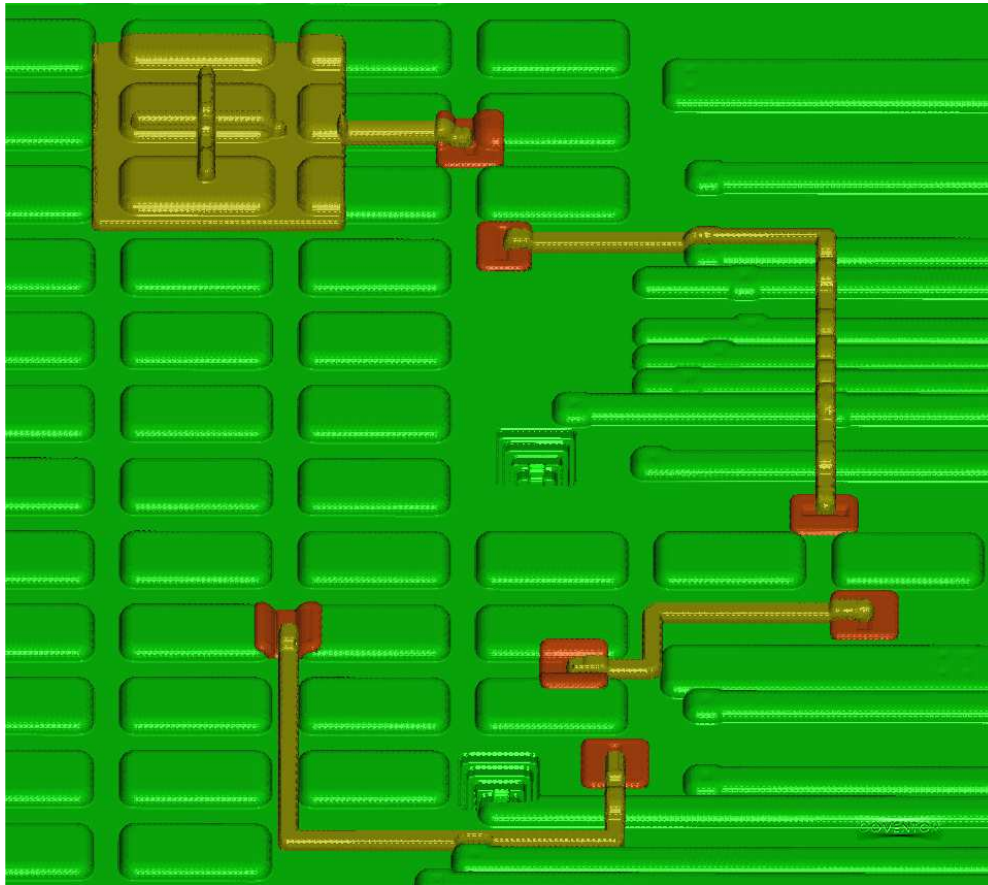


- Review each net

- Sequence of virtual circuit edit operations on device

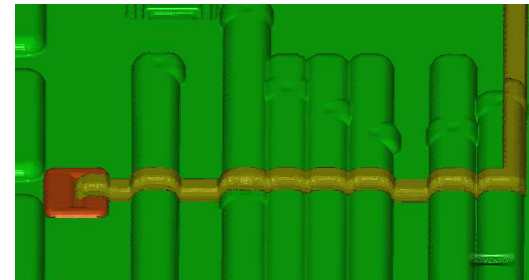
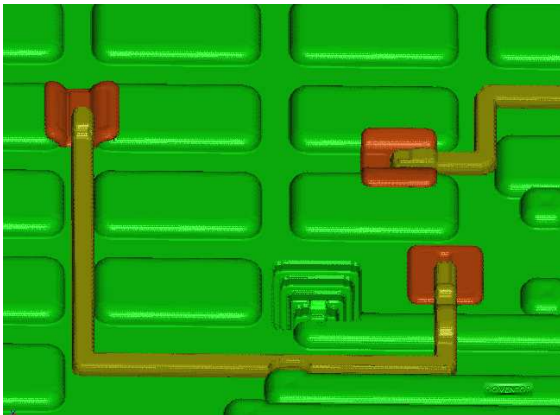
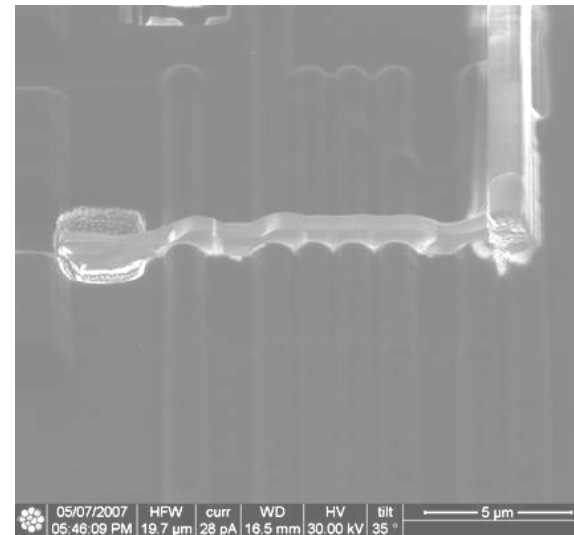
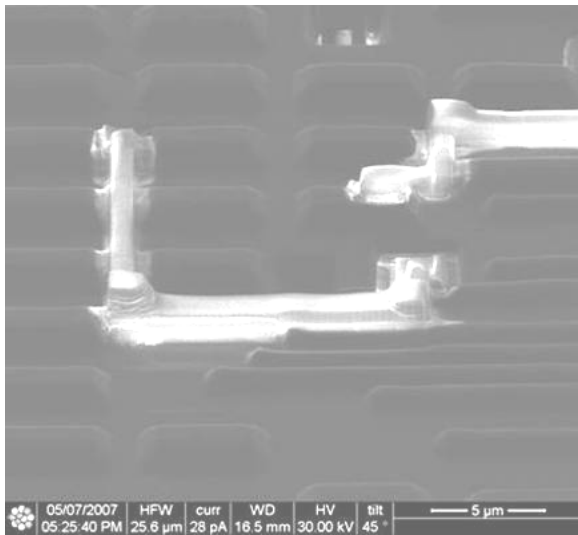


- Top level view of this circuit edit.



SEMulator3D Circuit Edit Model

- Tilted views of the deposition straps in the edit



SEMulator3D Circuit Edit Model

CE Work Instructions

Operation # 2 A_StepMill	■ Operation Complete
Top Rectangle Dimensions	Center 900.000, 2051.000 L 3.000, H 3.000
Bottom Rectangle Dimensions	Center 900.000, 2051.000 L 1.500, H 1.500
Number of Steps	3
Metal layer to reach (metalStop)	metal3_mat
Comments	

- Provide via intranet
- Reference existing CE Work Instructions
- Add Notes

Circuit Edit Instructions

SEMULATOR3D

CE Home Operations Related CEs FIB Operator Notes

Home / **Work Order** / Main
 Work Order:
 Knights Database:
 Layout:
 Type of CE

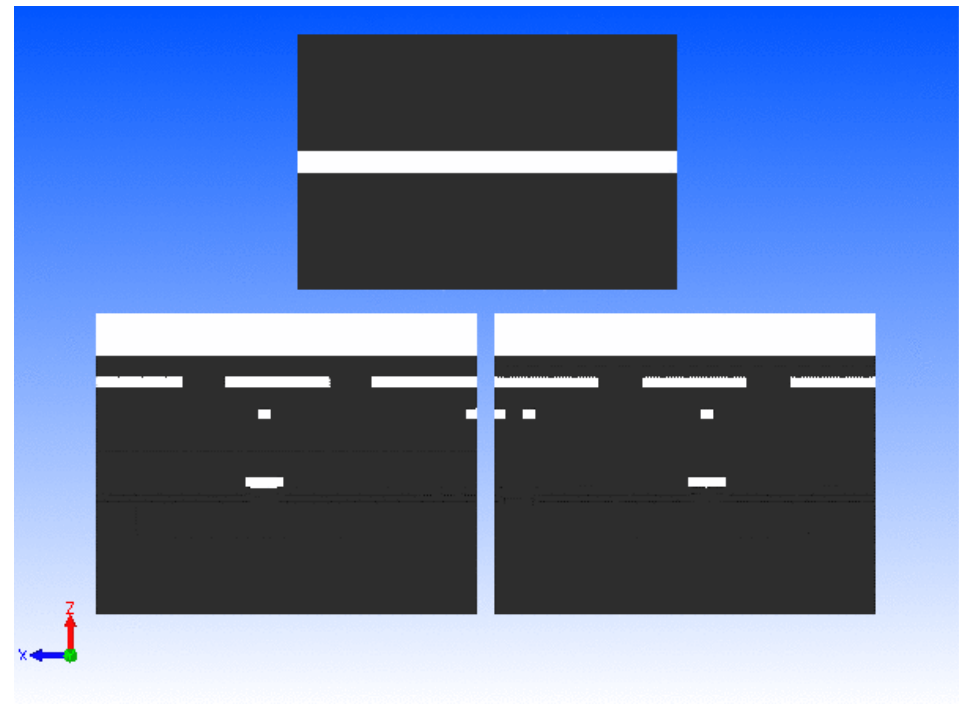
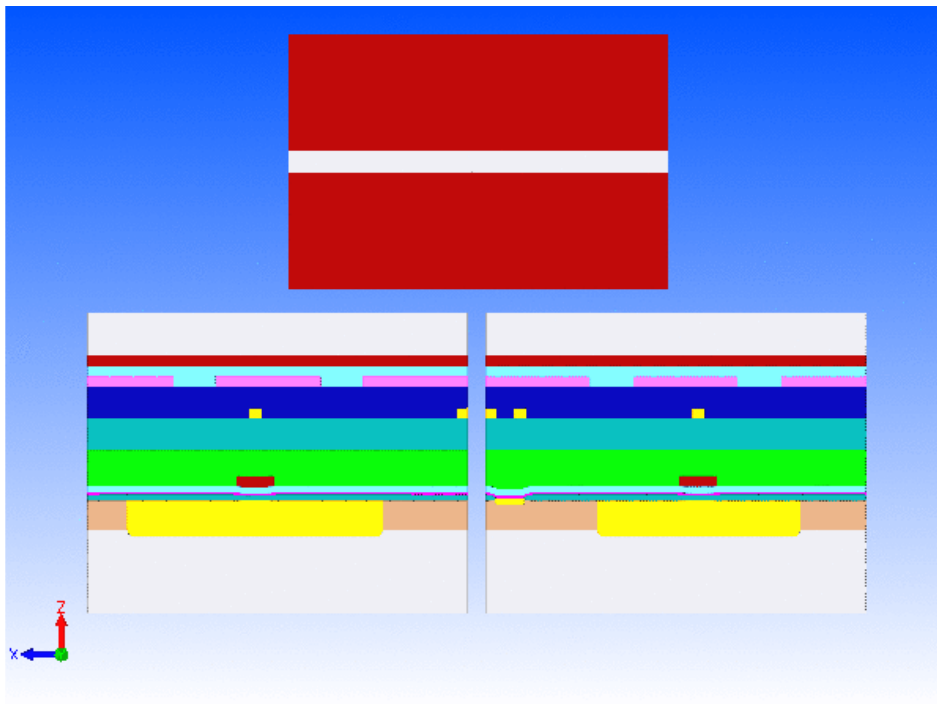
Delta Material Volume Report	um ³
metal3_mat	-1.634
OXIDE1	-78.910
metal4_mat	-1.008
metal2_mat	-0.115
CE_MillMetal	65.832
CE_Strap	82.235

Volume report for materials removed and added

Delta Material Volume Report
metal3_mat
OXIDE1
metal4_mat
metal2_mat
CE_MillMetal
CE_Strap

All

- Look ahead with the SEMulator3D model



- Use “Virtual FIB” to evaluate and analyze a Circuit Edit to determine the proper plan to achieve circuit edit success.
- SEMulator3D plugs into the existing tools and methodology to make the FIB user have increased CE success.
- FIB and TEM Sample Prep applications

Using
SEMulator3D
for Circuit
Edit
Work
Planning

