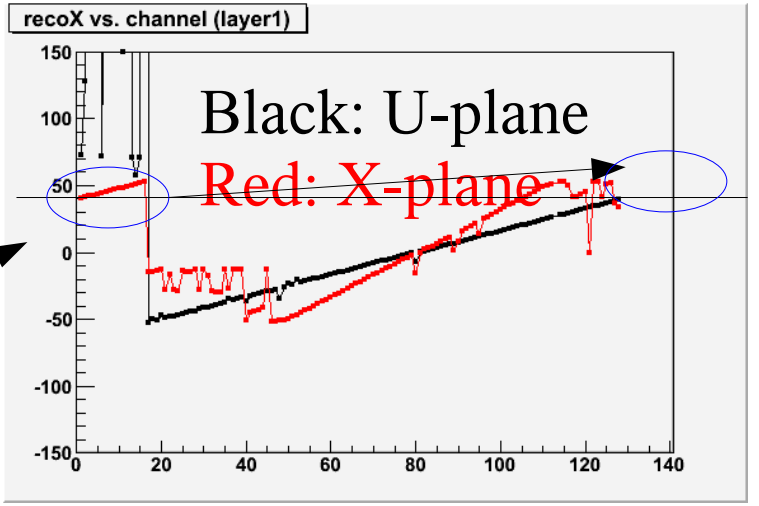
Mapper analysis

Jaewon Park

Channel Mapping

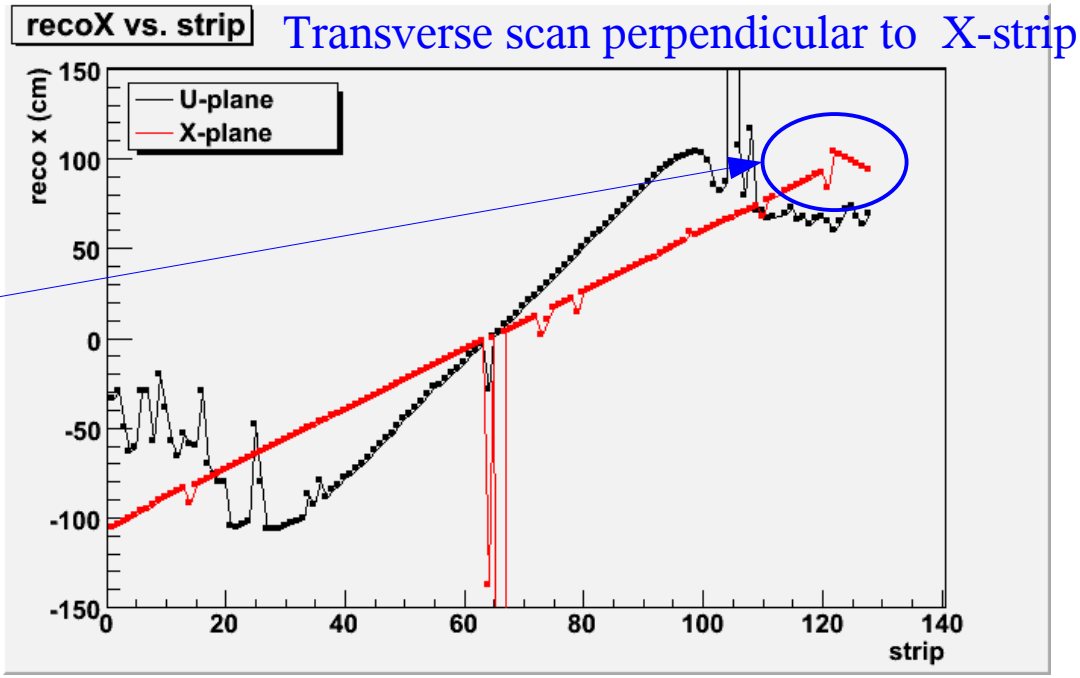


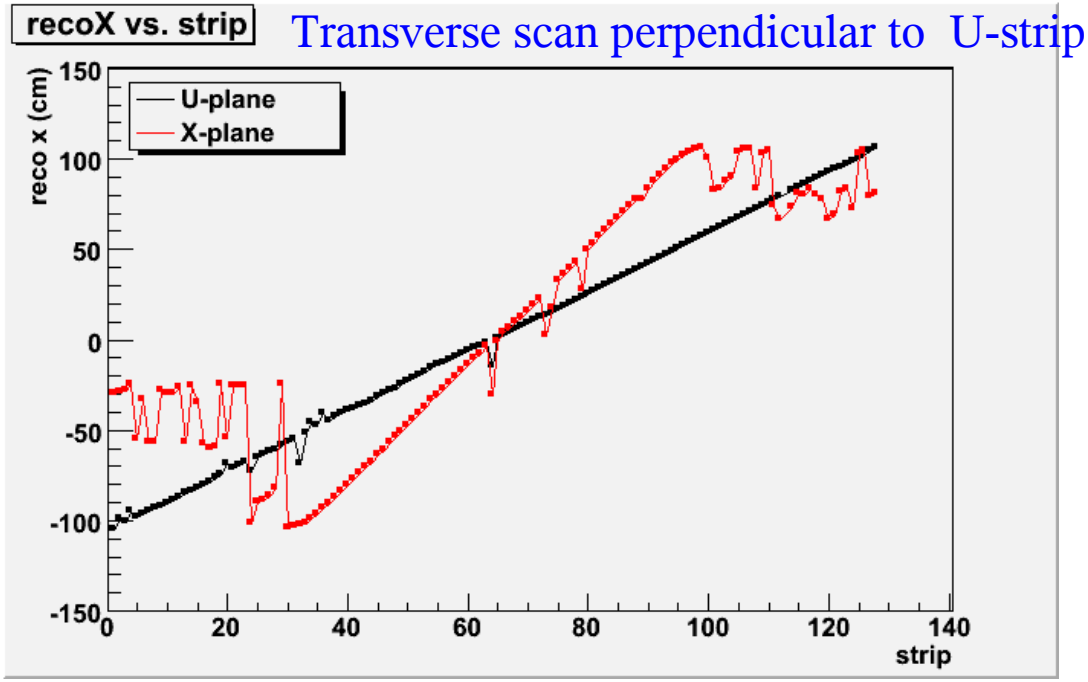
Plot shown last week

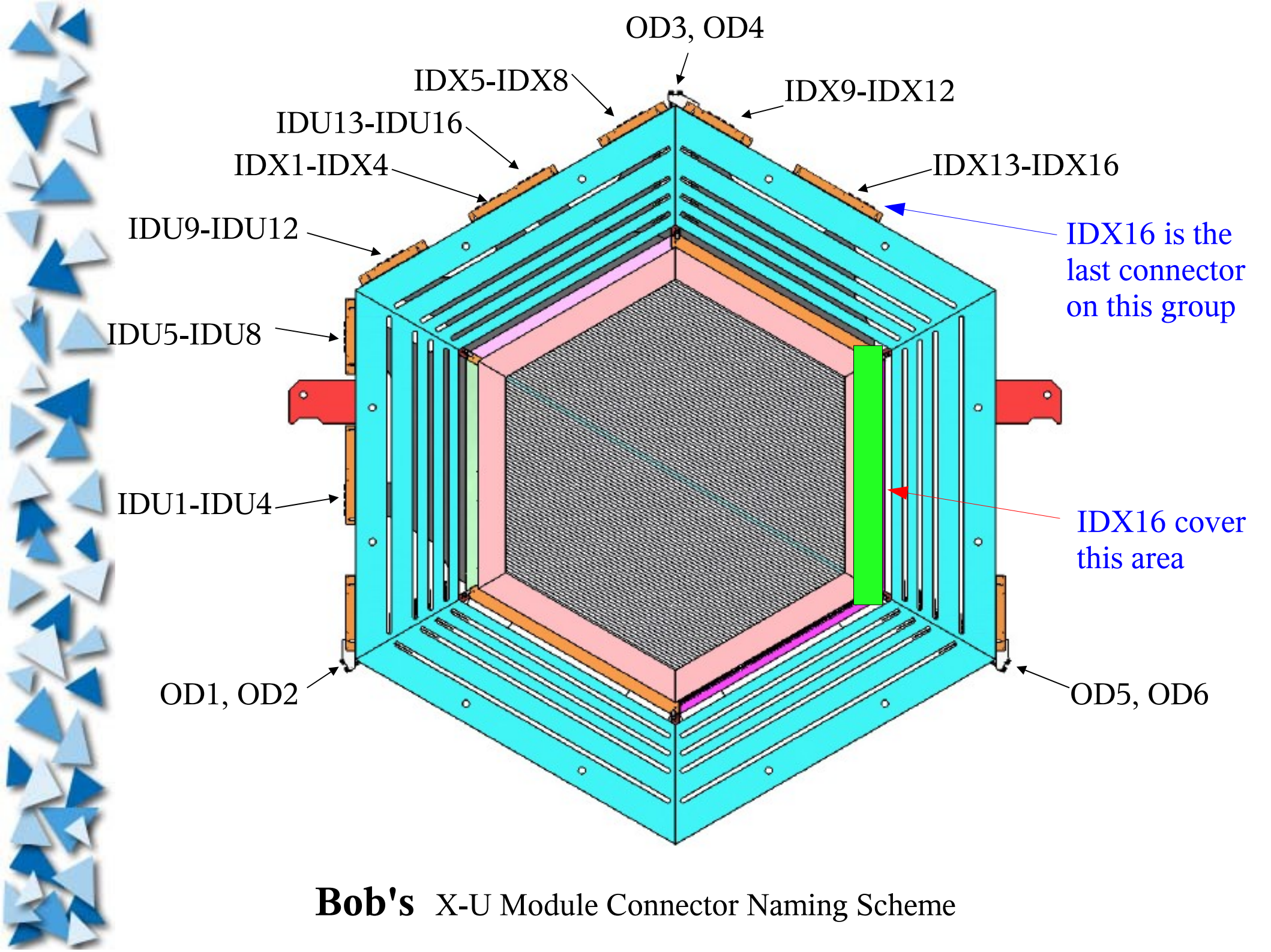
- Last week, channel mapping seems to be shifted by 16 channel.
  - I suspect Al's channel mapping configuration file.
- It's turned out my misunderstanding what channel means in data file.
  - I followed Bob's channel mapping scheme. (Serialized fiber number: 1-302)
    - Fiber 1-48: OD, Fiber 49-175: U-plane, Fiber 176-302: X-plane)
- But Al's channel means serialized PMT pixel number
  - Channel 1-64: 64-channels in PMT 1
  - Channel 65-128: 64-channels in PMT 2
  - Channel = 64*(iPmt-1) + iPixel

Reconstructed strip position after fixing mapping

- Both X and U-plane strip position looks good except last 8-channel in X-plane flipped.
- Each ID plane has 16 clear fiber cables.
  - X-plane: IDX1 – IDX16
  - U-plane: IDU1 – IDU16
- IDX16 seems flipped.
- Checked IDX16's fiber bundle orientation.
- Can check it visually by exposing light on one of connector and check other side.
- Fiber bundle orientation was okay.
- When it's connected on module side, it was connected opposite orientation by brute force.

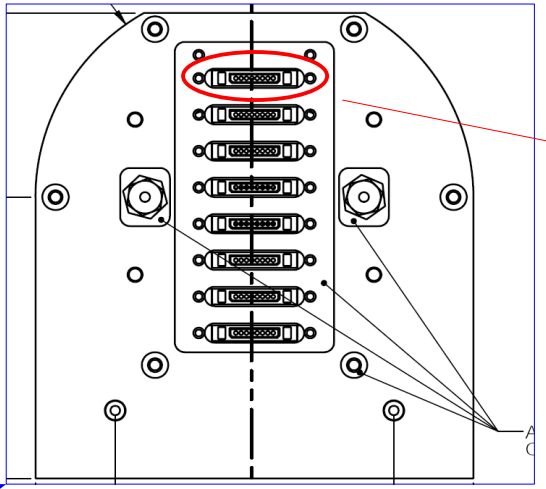


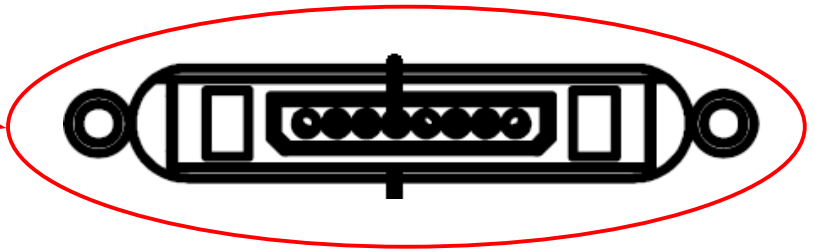




Bob's X-U Module Connector Naming Scheme

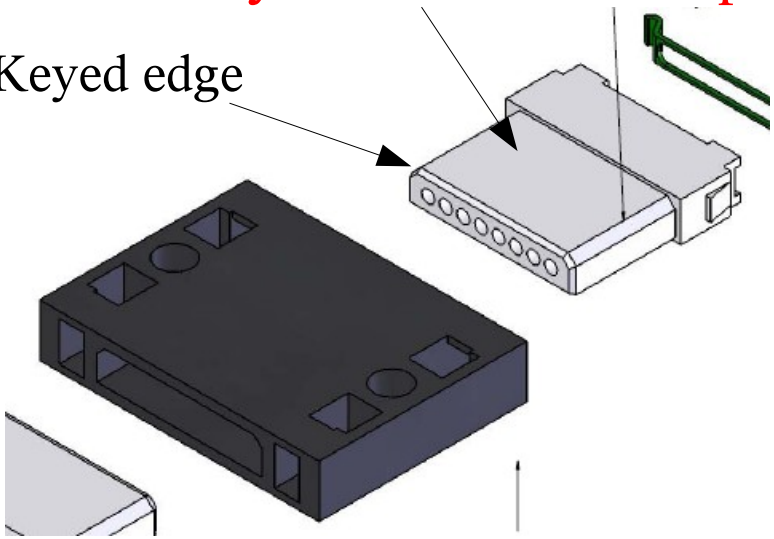
Face Down

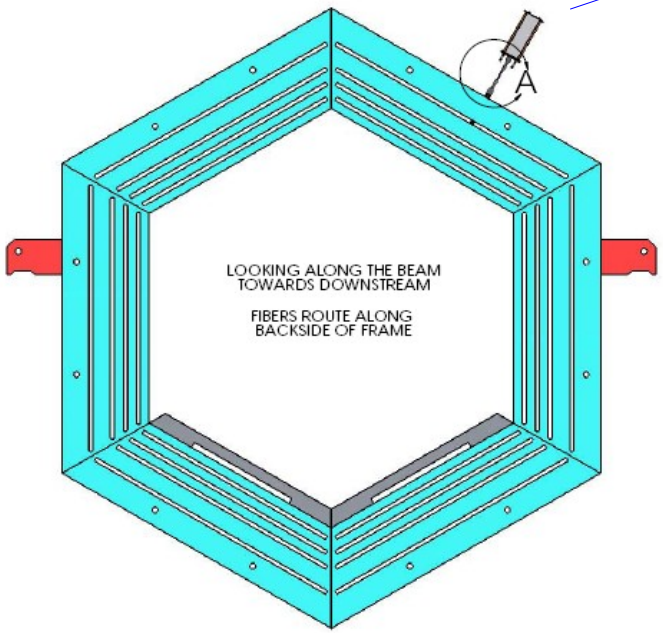


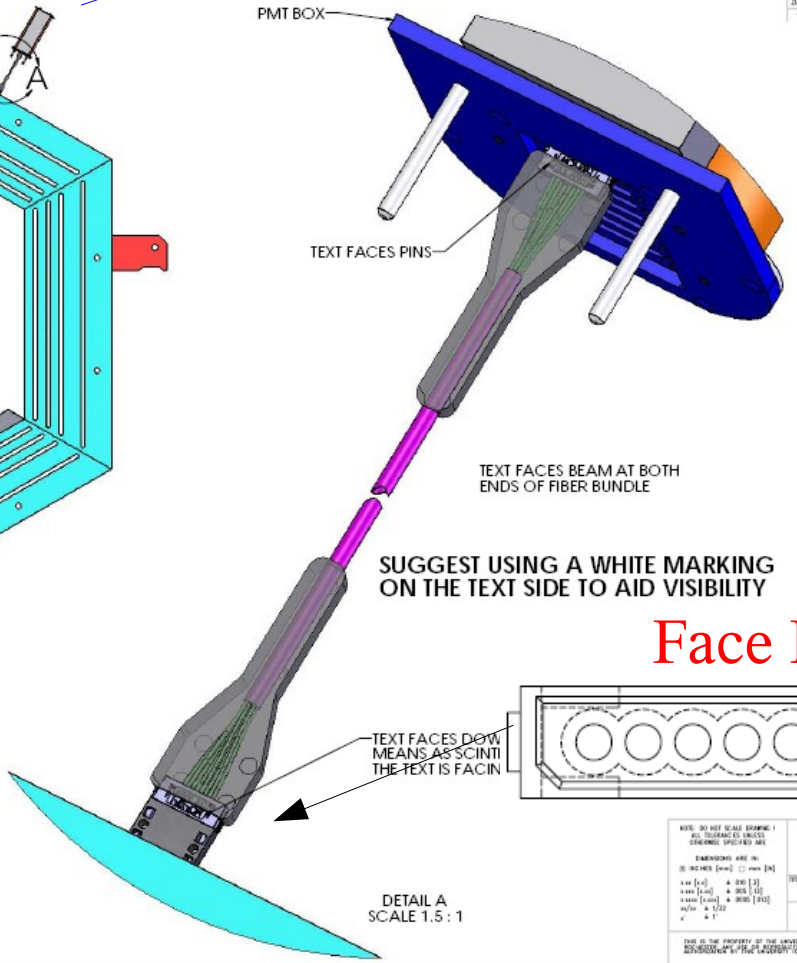


Keyed side is Face Up

Keyed edge



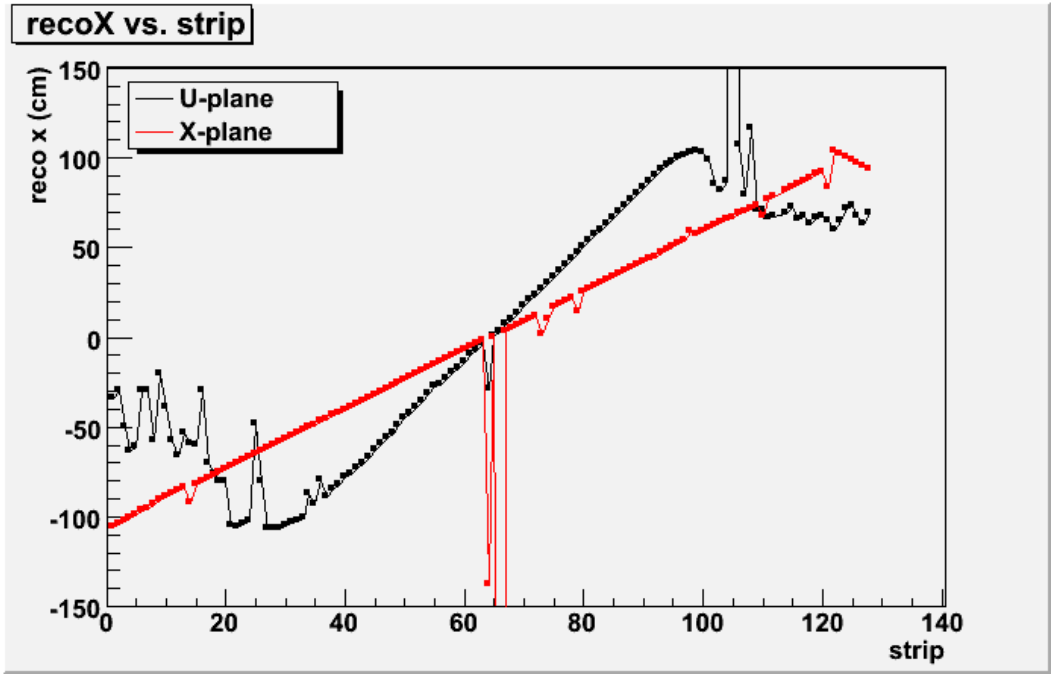


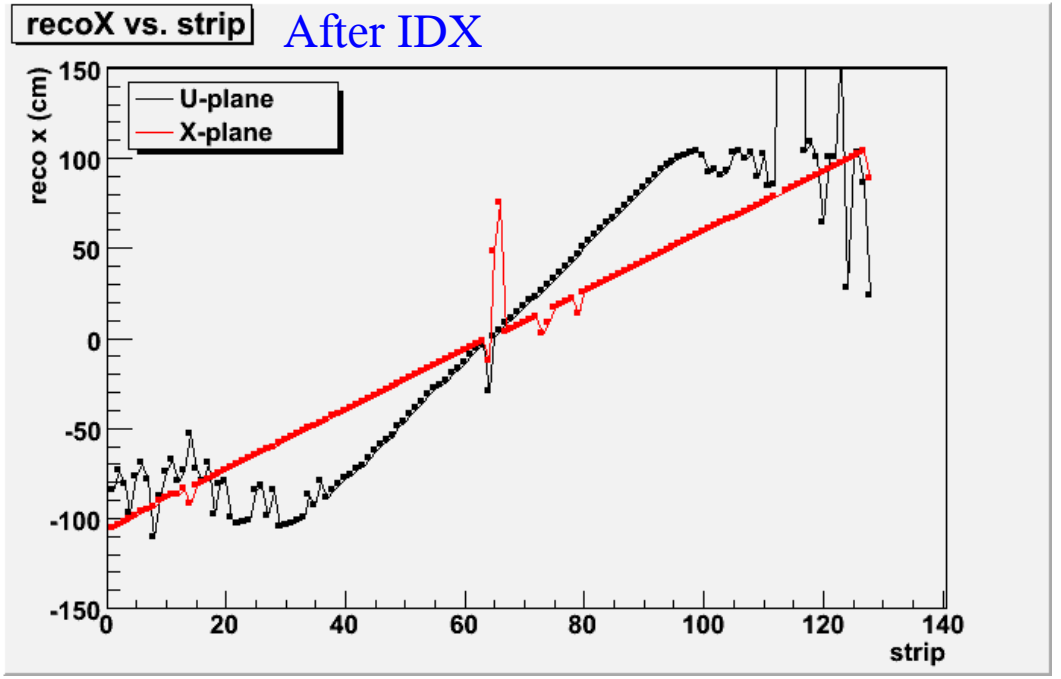


Face Down

After fixing flipped IDX16

- X-strip position is okay after fixing IDX16 connection.

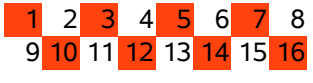




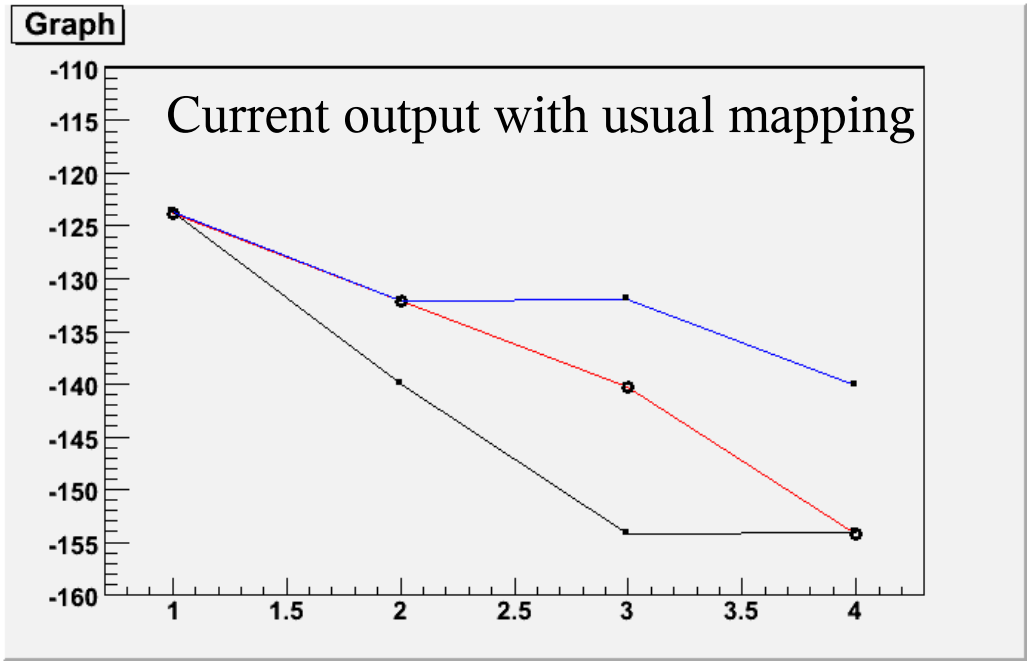
OD channel mapping still strange.

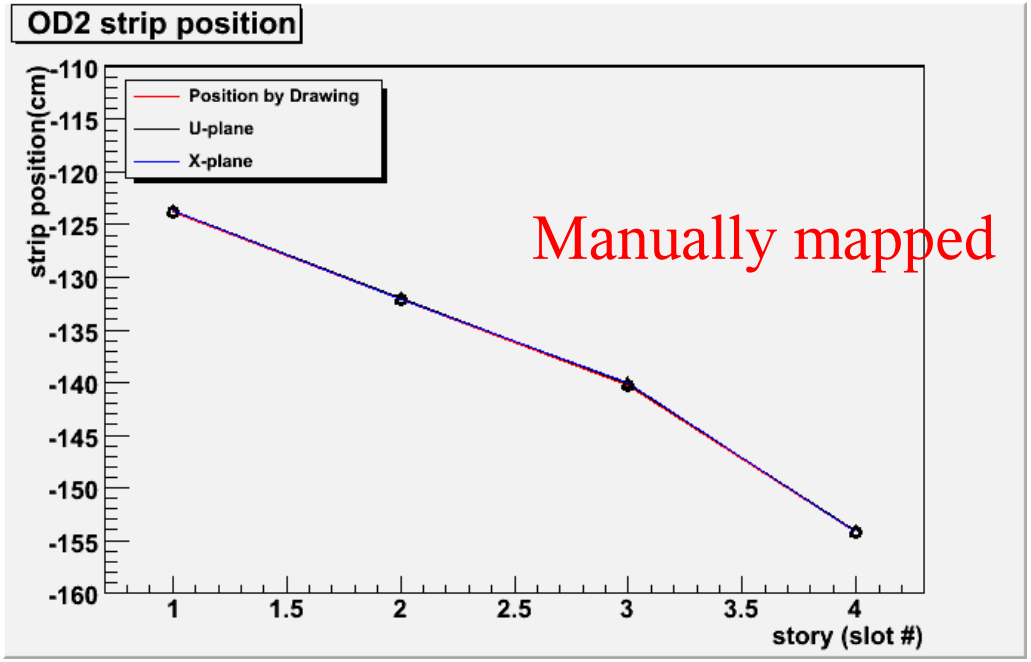
- It's unlikely that PMT fiber interweaving is incorrect.
- Other 4 PMT in ID was good.
- Flipping clear fiber cable doesn't help.
- Two possibilities are wrong fiber routing on module itself or bug on software.
-
- Checked each transverse scan plot and tried to determine strip position manually.
- Assigned story by reconstructed strip position
- Assigned layer by transverse scan curve's width.

channel=15, layer=1, tower=2, story=1
channel= 8, layer=1, tower=2, story=2
channel= 4, layer=1, tower=2, story=3
channel= 2, layer=1, tower=2, story=4
channel=13, layer=2, tower=2, story=1
channel=11, layer=2, tower=2, story=2
channel= 9, layer=2, tower=2, story=3
channel= 6, layer=2, tower=2, story=4



Pixel pattern





Parameter optimization

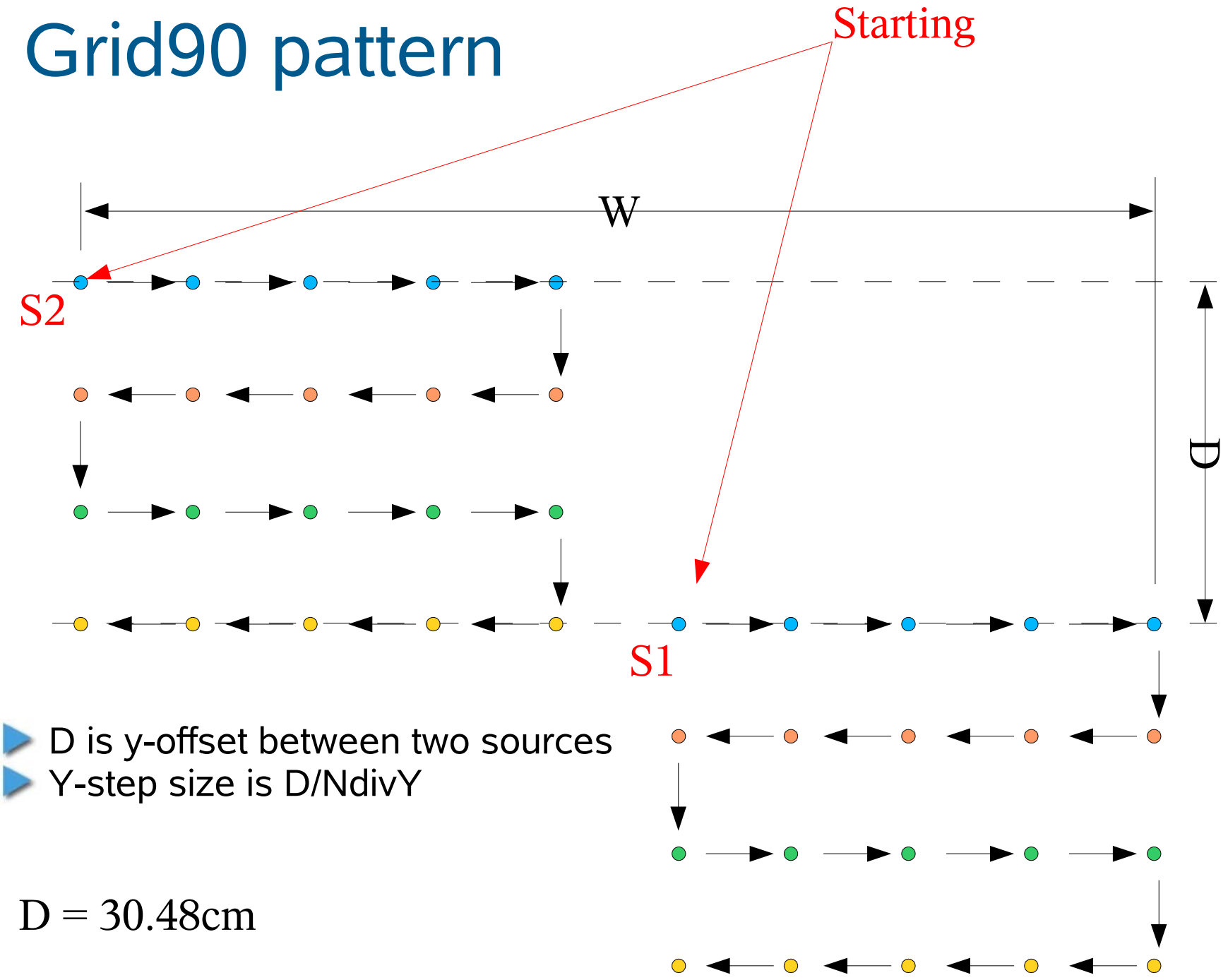
- Parameters
  - Relative source intensity (source 1 and source 2 intensity comparison)
  - Gate reading per source position
  - Gate width
  - Gain
  - Register 3
- Scan number is gate reading per source position)
- If scan number is reduced, total scan time reduced dramatically.
- Scan number 1000 still gives not too bad data
- Fixed scan number 1000 and took data with various gate width. (haven't looked at the result)

Data file name	Date	Scan Num	Orient	Source	Gain	Reg. 3	Gate Width
JaewonPlay.txt	05/29/08	10000	X		9	40	200
LongLine.txt	06/17/08	10000	X	1	9	40	200
LongLineU.txt	06/17/08	10000	U	1	9	40	200
longLineU-3.txt	06/19/08	10000	U	1	9	40	200
LongLineU-4.txt	06/23/08	10000	U	1	9	40	200
LongLineU-5.txt	06/24/08	10000	U	1	9	40	200
LongLineU-6.txt	06/24/08	10000	U	1	9	40	200
LongLineU-7.txt	06/25/08	10000	U	1	9	40	200
LongLine-2.txt	06/26/08	5000	X	1	9	40	200
LongLine-3.txt	06/30/08	2000	X	1	9	40	200
LongLine-4.txt	06/30/08	1000	X	1	9	40	200
LongLineS2-1.txt	06/30/08	1000	X	2	9	40	200
LongLine-5.txt	07/01/08	1000	X	1	9	40	175
LongLine-6.txt	07/01/08	1000	X	1	9	40	150
LongLine-7.txt	07/01/08	1000	X	1	9	40	125
LongLine-8.txt	07/01/08	1000	X	1	9	40	100
LongLine-9.txt	07/01/08	1000	X	1	9	40	75
LongLine-10.txt	07/01/08	1000	X	1	9	40	50
LongLine-11.txt	07/01/08	1000	X	1	9	40	25

More than single transverse scan

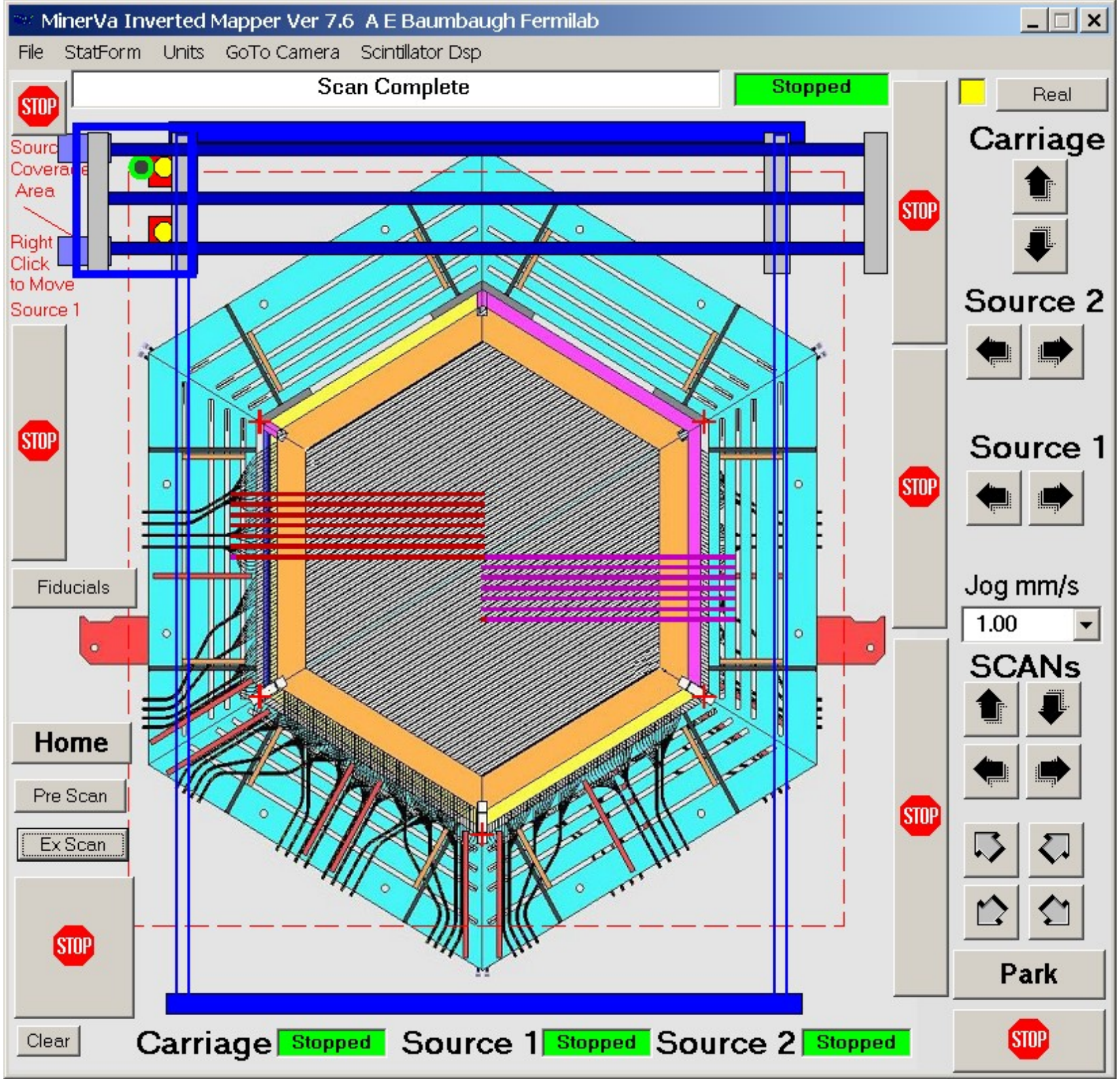
- Current analysis code can handle only single transverse scan path.
- Need to have data grid data to develop software
- Also need to optimized source path

Grid90 pattern



- D is y-offset between two sources
- Y-step size is D/NdivY

D = 30.48cm


MinerVa Inverted Mapper Ver 7.6 A E Baumbaugh Fermilab
File
StatForm
Units
GoTo Camera
Scintillator Dsp
Scan Complete
Stopped
Real
STOP
Source Coverage Area
Right Click to Move Source 1
Carriage
Source 2
Source 1
Fiducials
Jog mm/s
1.00
SCANs
Home
Pre Scan
Ex Scan
Park
Clear
Carriage Stopped
Source 1 Stopped
Source 2 Stopped

Hex pattern (Plan)

D = 30.48cm