



# TOWARDS A STRAW MAN

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VELO Upgrade Meeting, 28/04/10



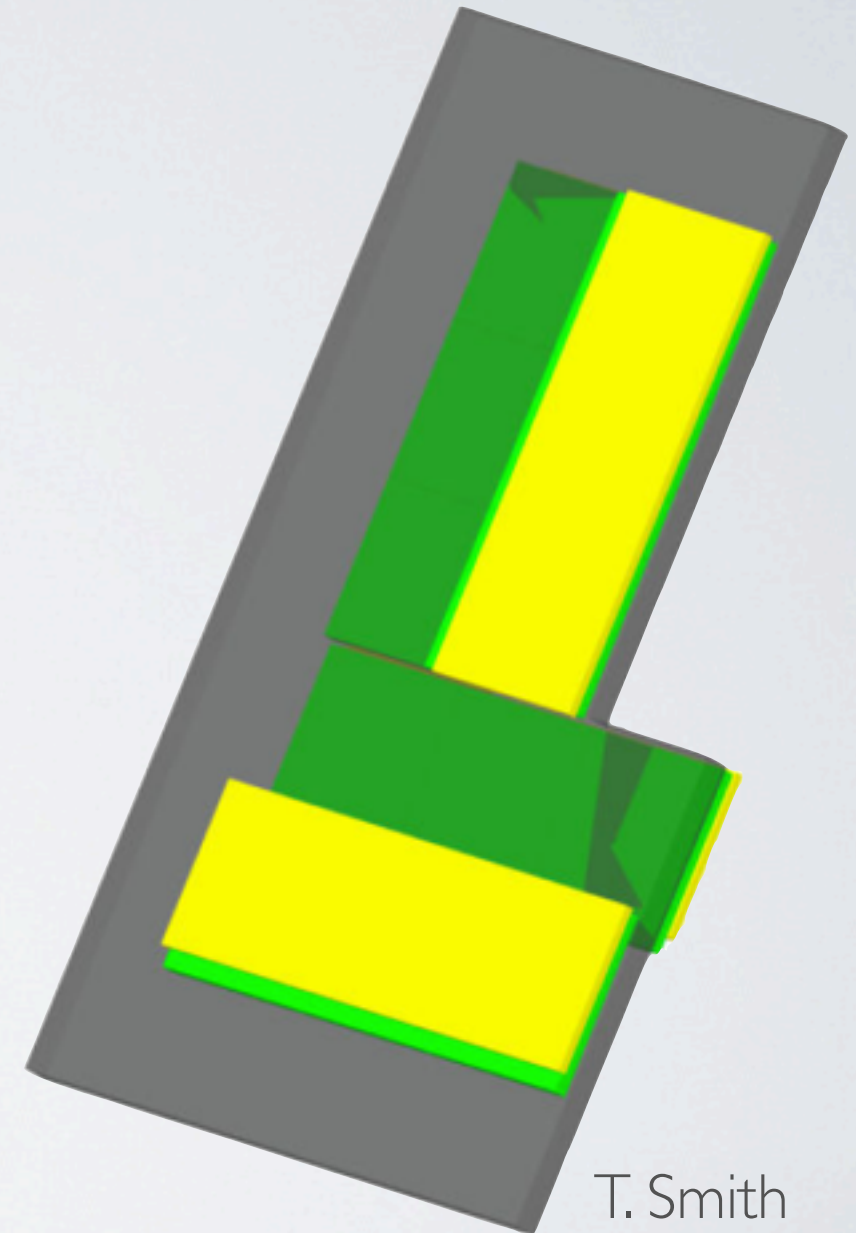
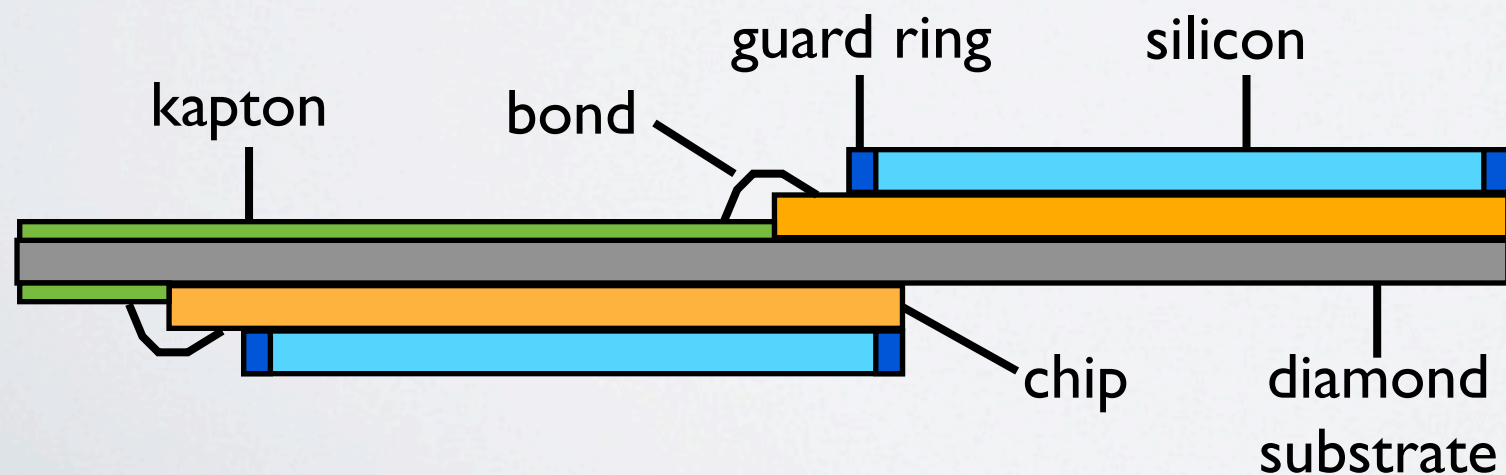
# INTRO

- Follow-up of my talk from two weeks ago (and the slides on last week's agenda)
- Try to define straw man layout today

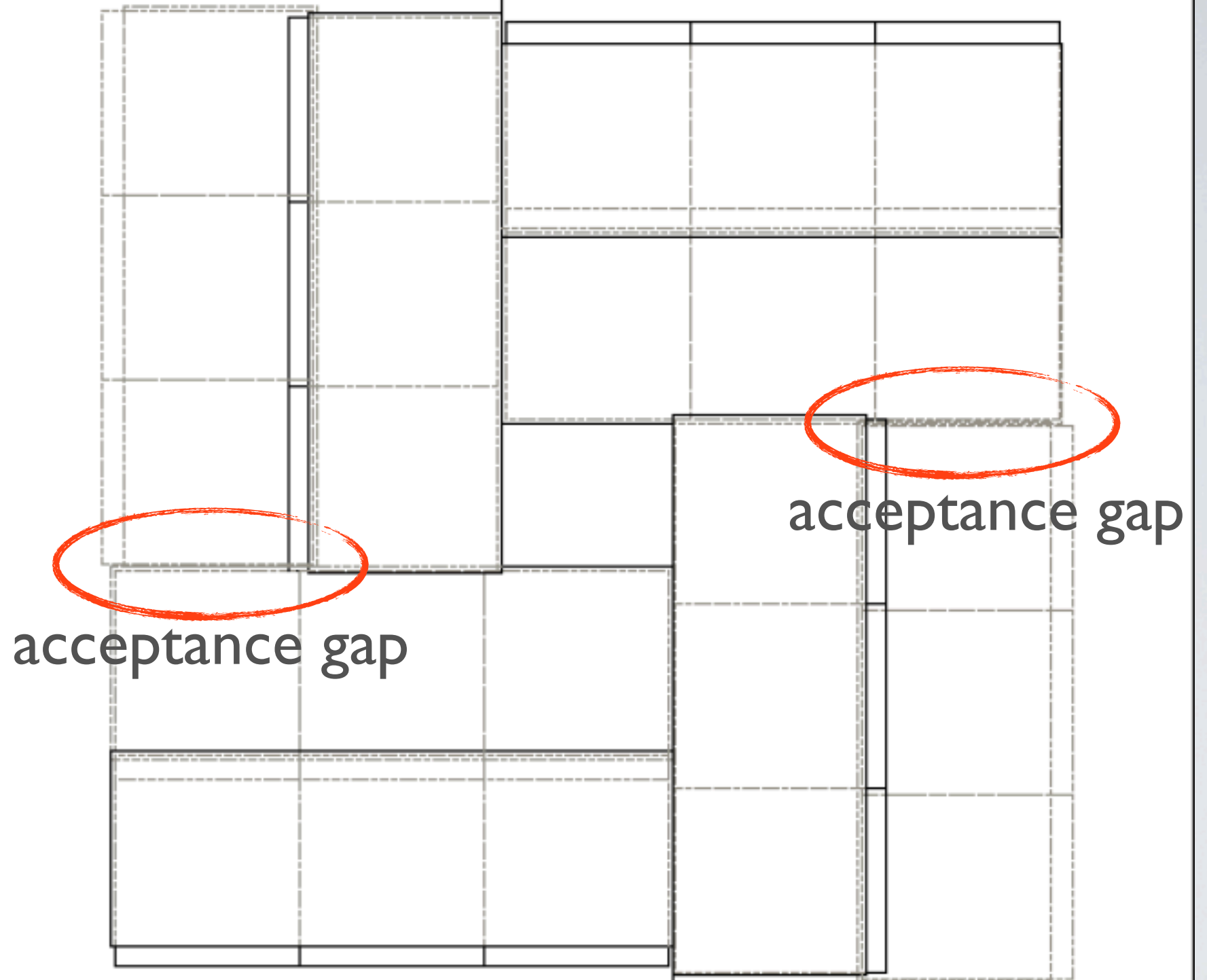


# PSEUDO DOUBLE SIDED

- Avoid bi-metallic effects by splitting 6 chip unit in two rows of 3 chips mounted on either side of the substrate
- No requirement for TSVs
- Reduced risk in assembly but now 2-sided
- 2 options: 3 chip unit or 3 individual pieces



Only two gaps in acceptance in x-y projection



# SOME NUMBERS

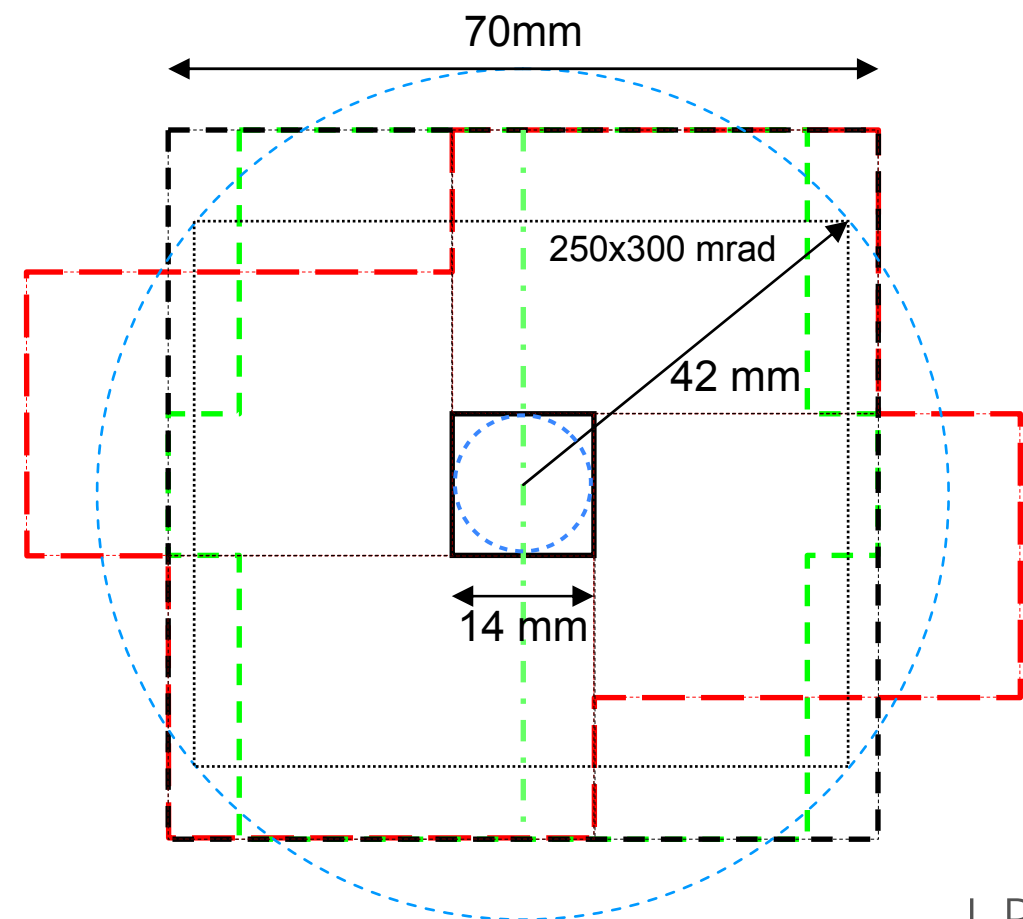
- Assume 3 chip units with common guard ring
- Overlap such that active area is gap-less in x-y projection
- Guard ring: 500  $\mu\text{m}$
- Single chip: 14.1 mm  $\times$  14.1 + 1 mm, 1 for readout pads
- Thicknesses:  
substrate 200  $\mu\text{m}$ , chip 150  $\mu\text{m}$ , silicon 150  $\mu\text{m}$ , glue 50  $\mu\text{m}$ ?



# Z DISTRIBUTION

- Different coverage in x-y leads to different acceptance
- Adapt by changing z distribution
- 25 station layout optimised for U-shape exists with minimum pitch of 24 mm
- Simulated by Steve Blusk for L-shape

L-shaped 1  
L-shaped 2  
U-shaped  
VELO sensor



J. Buytaert

# Z DISTRIBUTION

- Suggested layout for 24 mm spacing

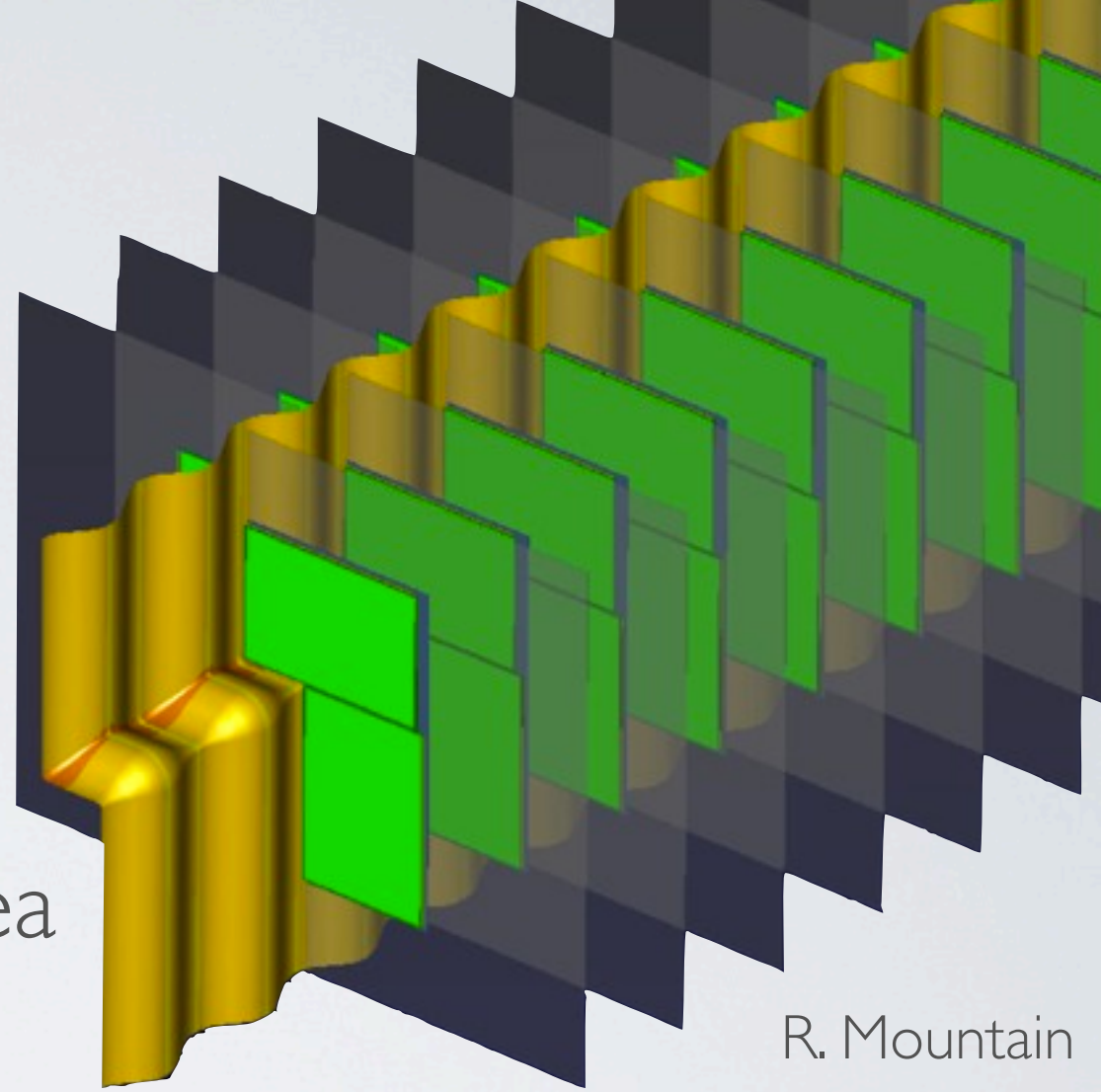
`z_pix_A = [ -114., -93., -69., -45., -21., 3., 27., 51., 75., 99.,123., 147., 171., 195., 240., 310., 385., 470., 600., 650., 700., 750. ]`

`z_pix_C = [ -102., -81., -57., -33., -9., 15., 39., 63., 87.,111.,135., 159., 183., 207., 252., 298., 373., 458., 588., 638., 688., 738. ]`

- Questions:
- Impact of additional material?  
Probably roughly balanced by smaller corrugations



# FOIL



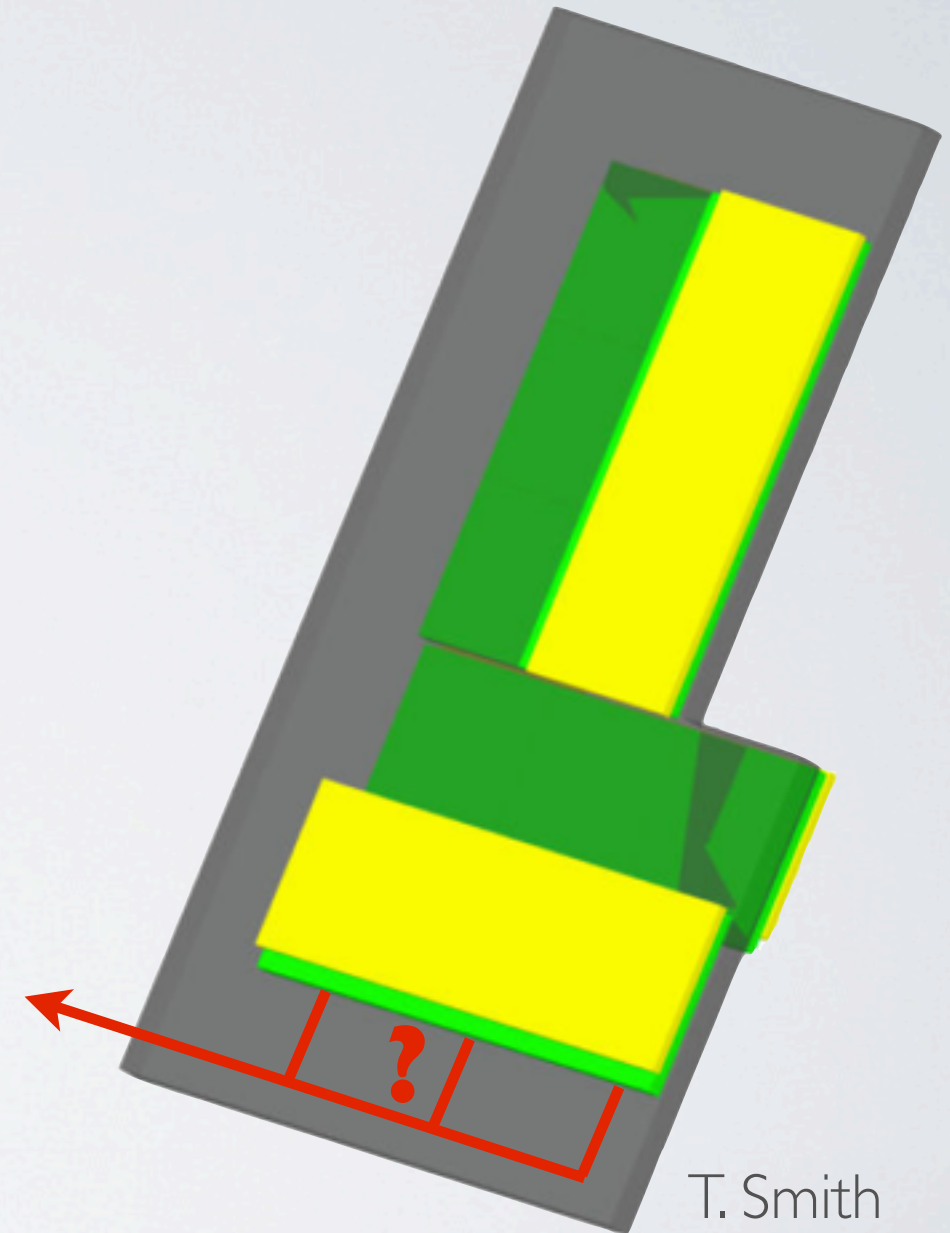
R. Mountain

- Rather broad agreement on basic idea
- Needs to be defined in more detail
- May need to adjust to different z-distribution
- WP 10 organised by Ray Mountain



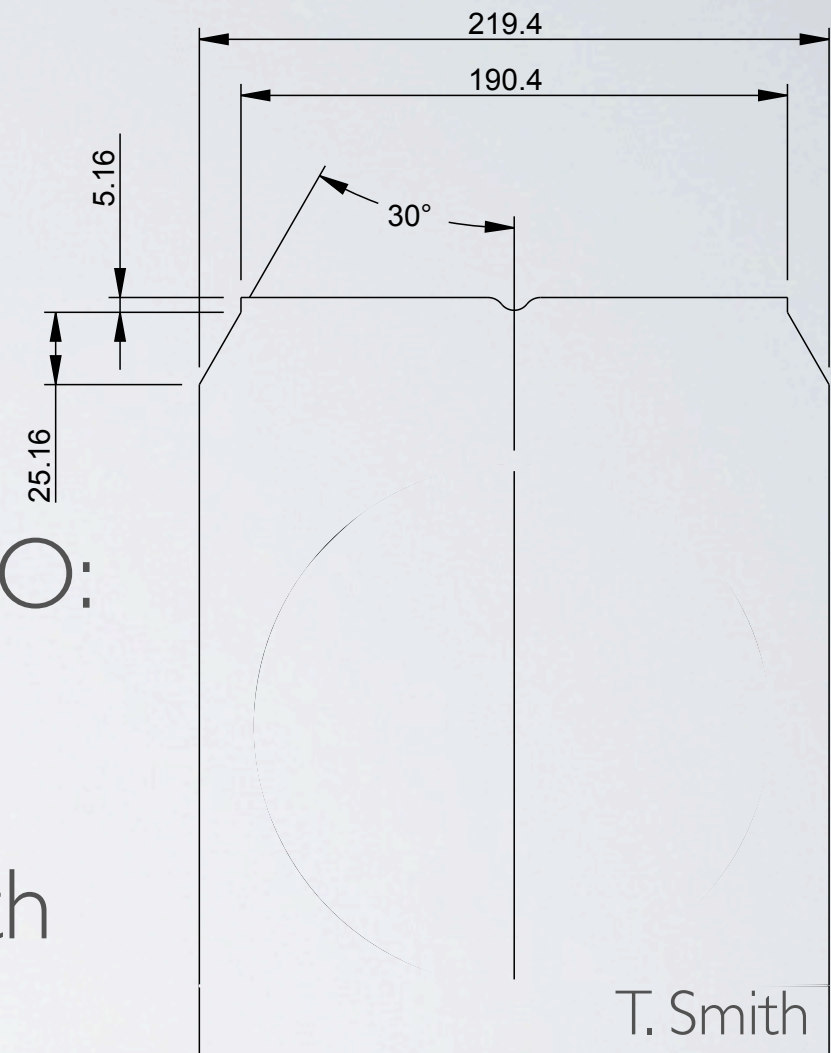
# COOLING & READOUT

- Where to put the cooling?
- How to combine efficiently cooling and signal routing?
- How to accommodate 90° turn in readout of side pieces?
- Input from relevant WVP needed



# READOUT

- Info from Tony:
- More space available than with current VELO:  
190-220 mm rather than 160 mm
- Using the available space reduces issues with readout of “side” chips
- Large modules probably only possible with TPG hybrids





# ALTERNATIVES

- Lots of alternatives studied by Steve Blusk (see his talk)
- Angled modules (the Angel of Amsterdam returns)

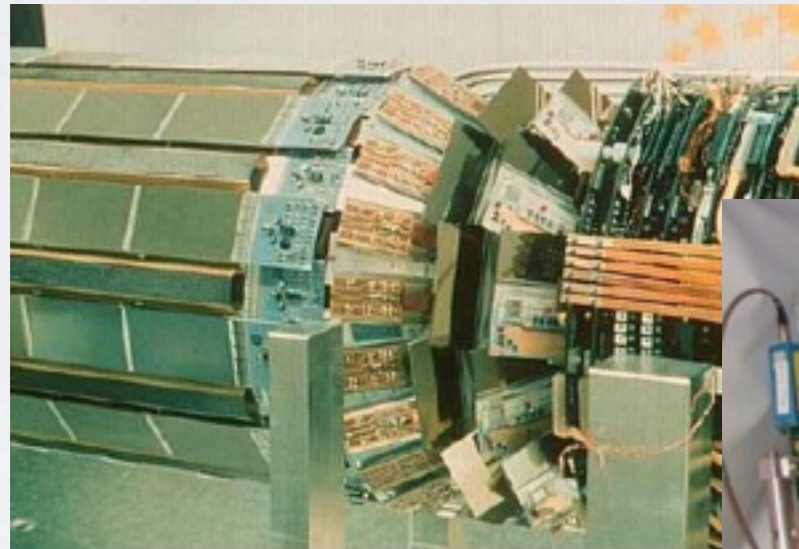
- Reduced guard ring width

- Reduced beam hole

- Floating pixels

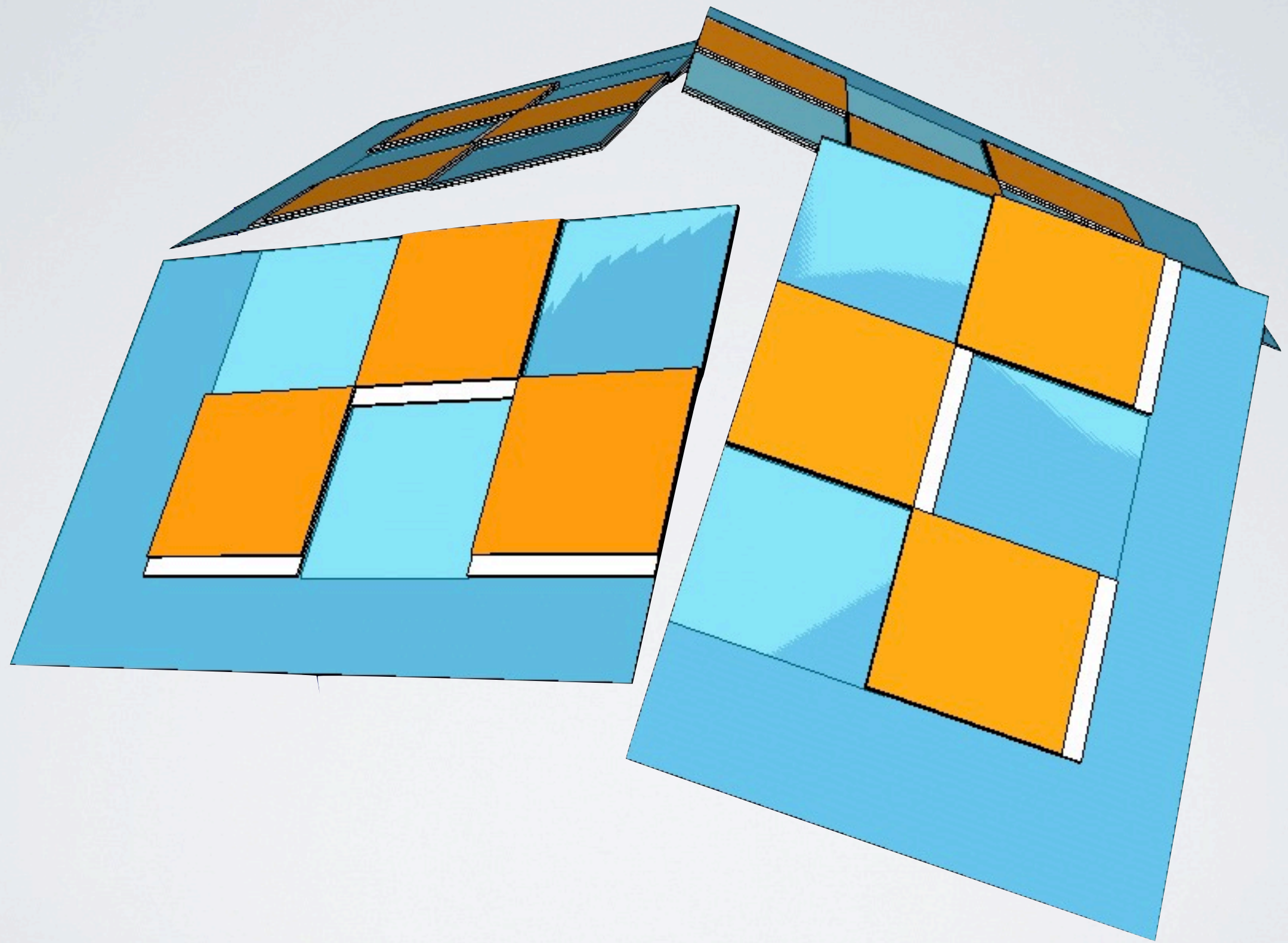
- Don't consider for straw man now, but perfect to know how potential future improvements would impact the performance

- Also: strip option (see Abraham's talk)



FASTEN YOUR SEATBELT!





# TODO

- Define cooling & readout structure for straw man design
- Documentation:
  - Twiki
  - LOI:
    - main focus: layout defined here
    - also: alternatives presented in the past and today including strip