



TOWARDS A STRAW MAN

Marco Gersabeck (CERN)
VELO Upgrade Meeting, 28/04/10

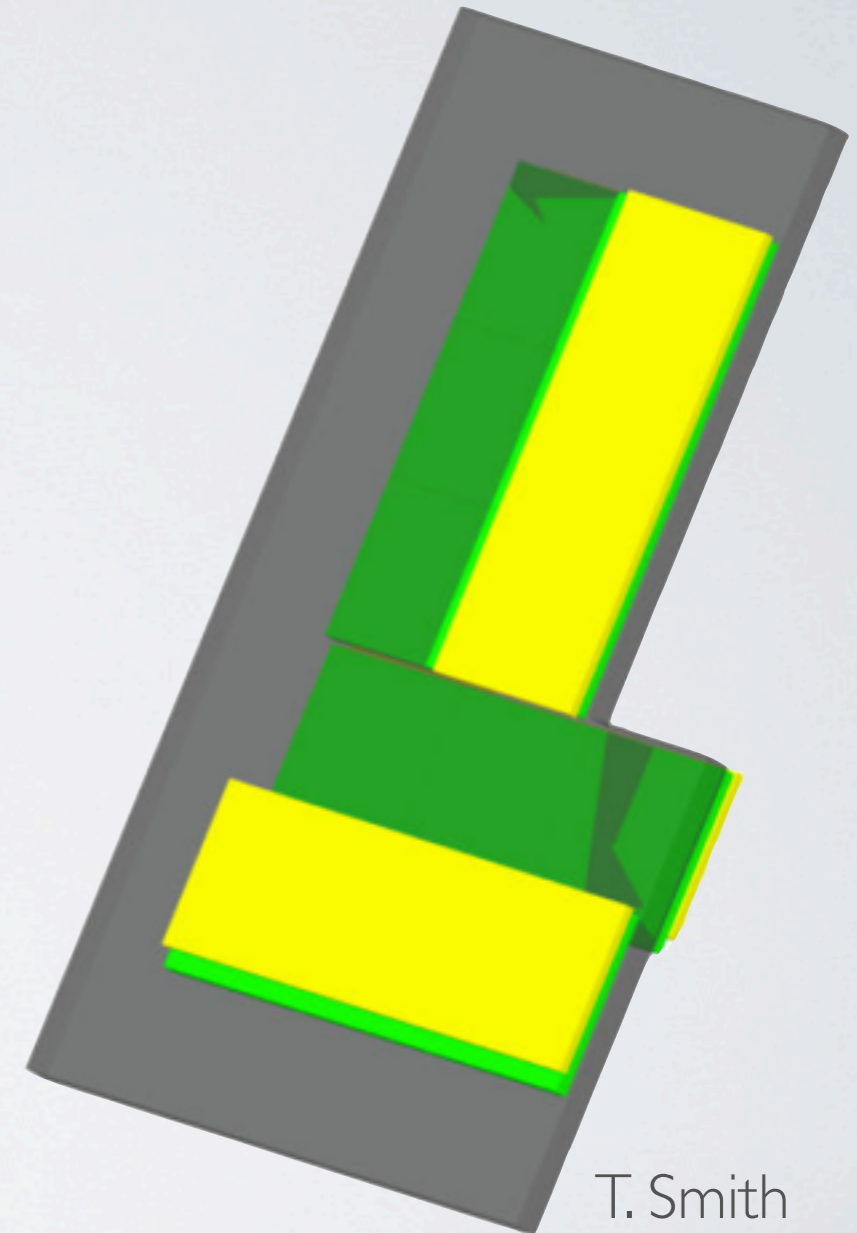
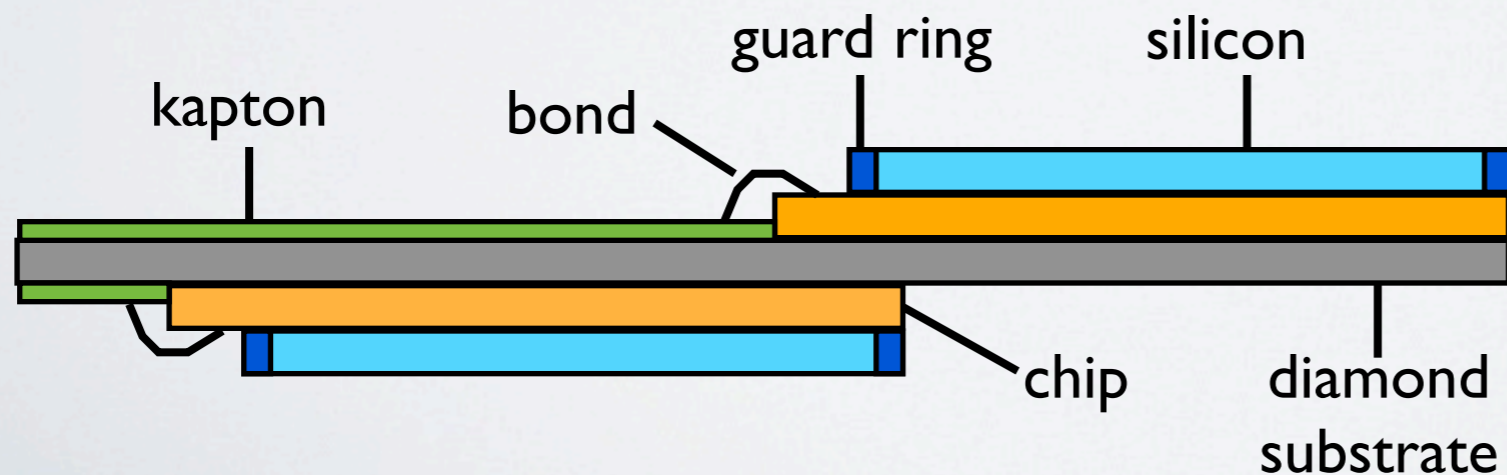


INTRO

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

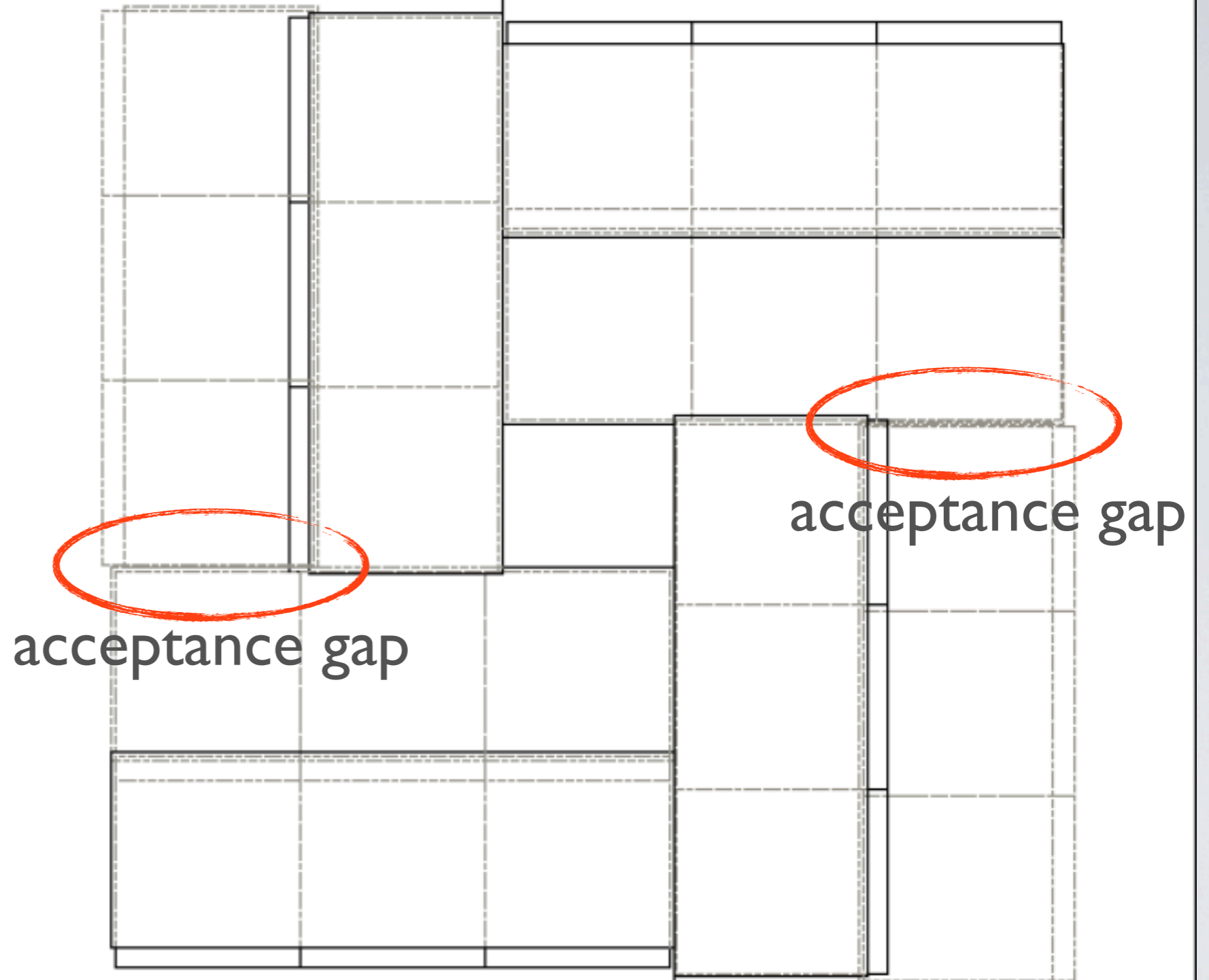
PSEUDO DOUBLE SIDED

- 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



T. Smith

Only two gaps in acceptance in x-y projection



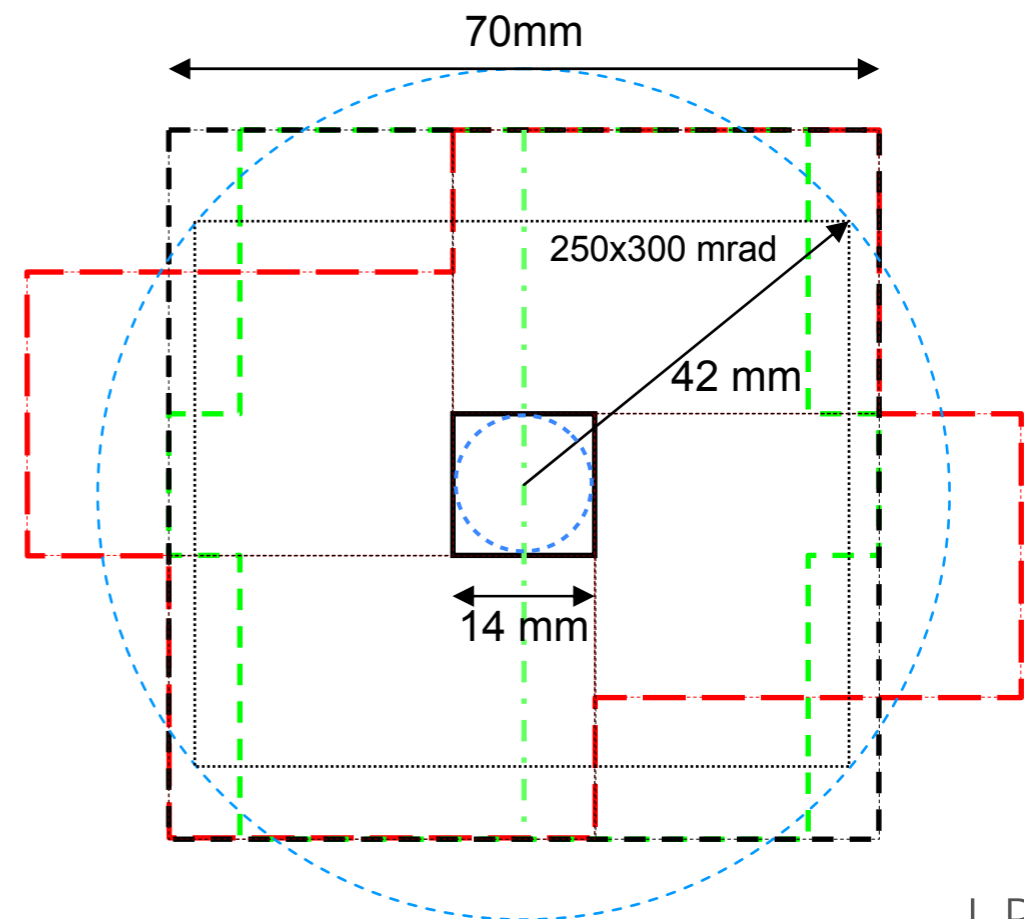
SOME NUMBERS

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

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

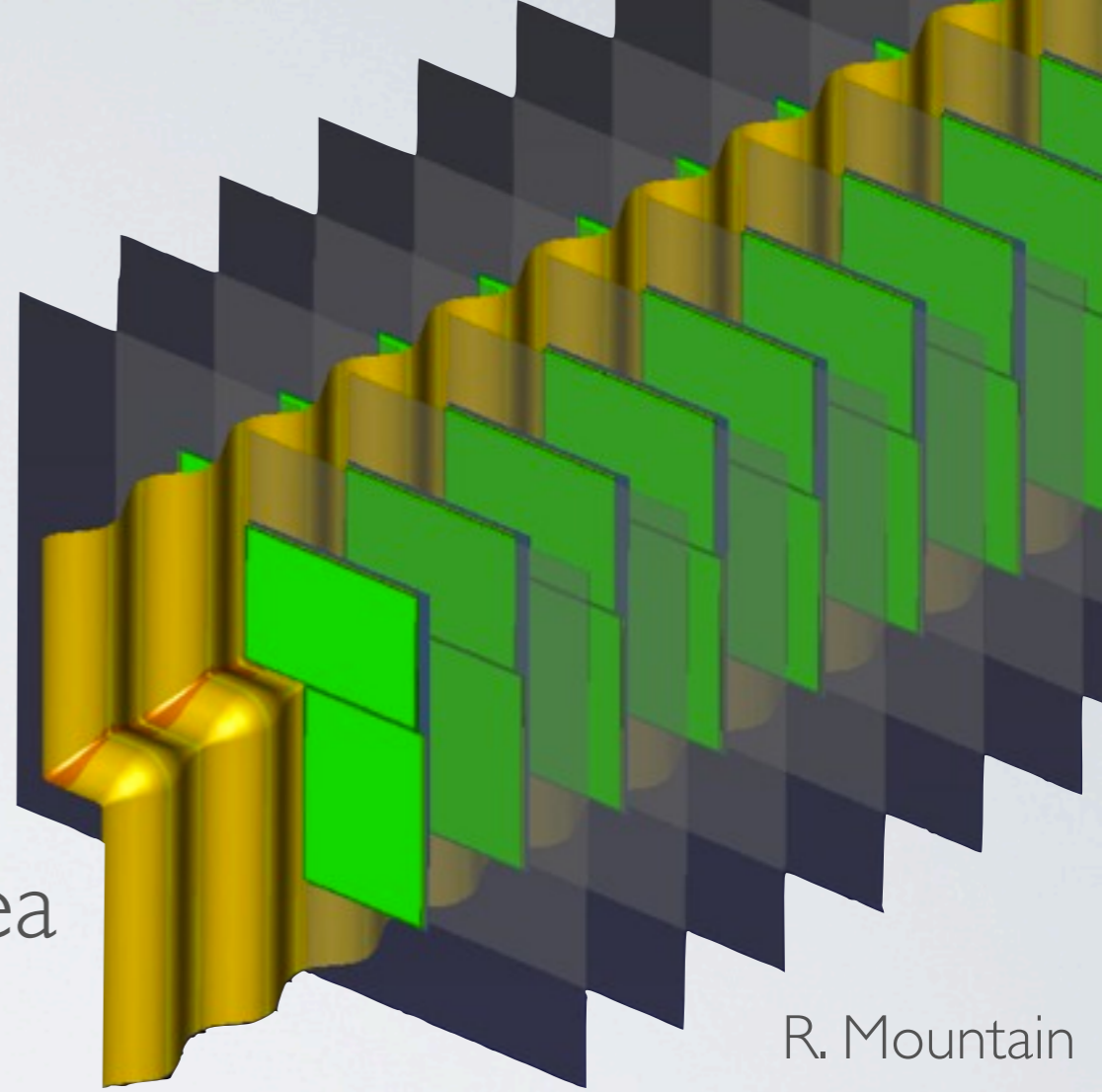
- Suggested layout for 24 mm spacing

`z_pix_A = [-117., -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

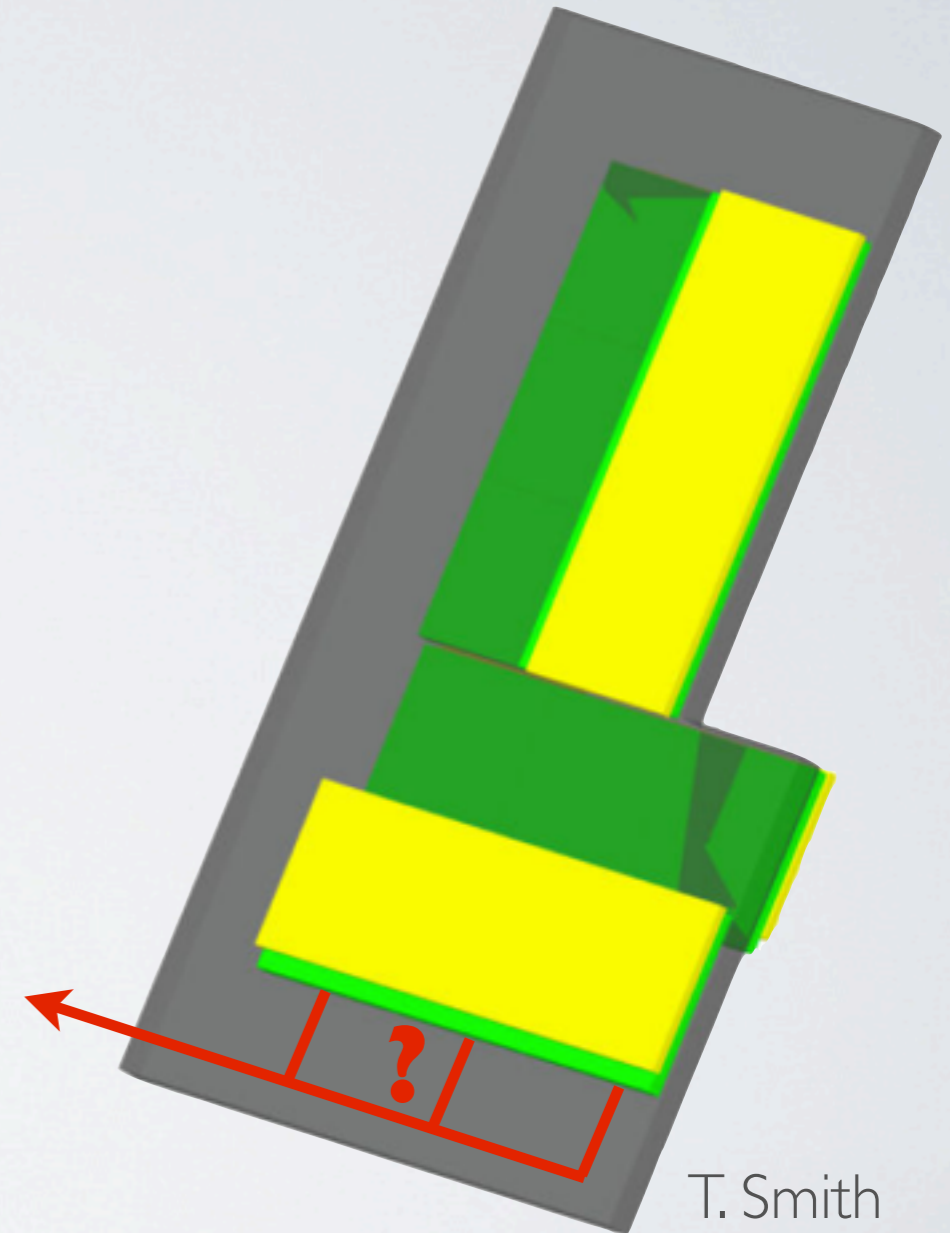


R. Mountain

- 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

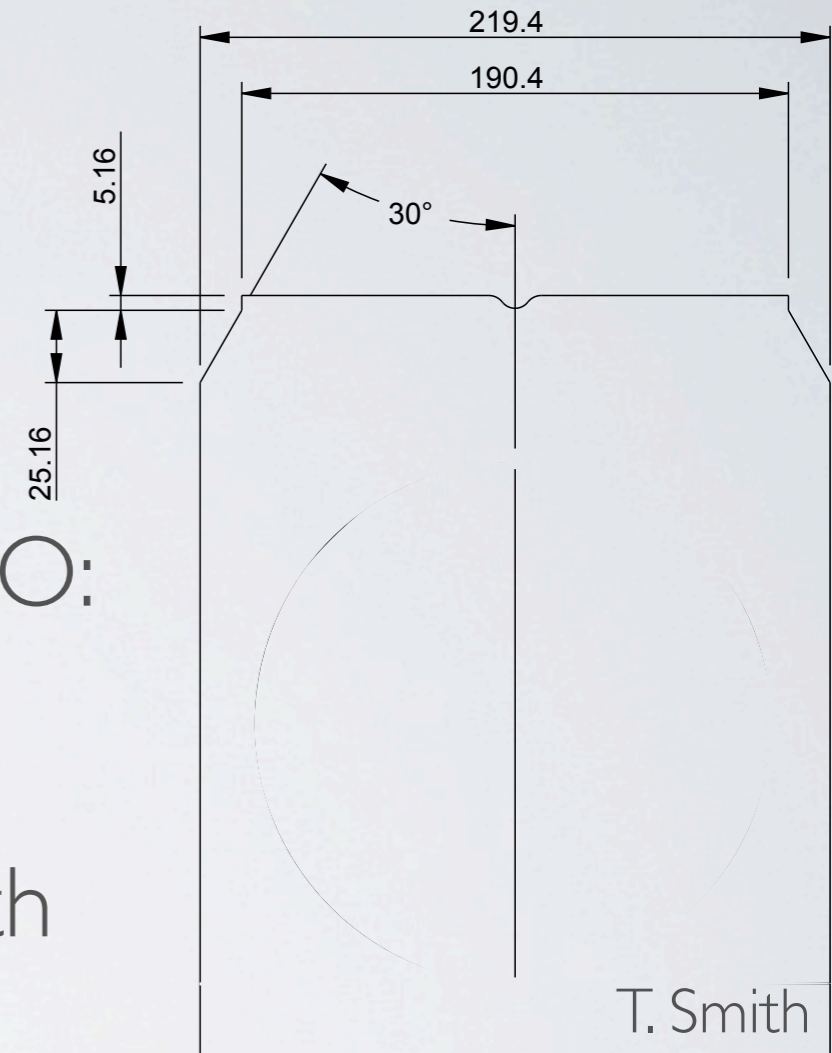
COOLING & READOUT

- 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

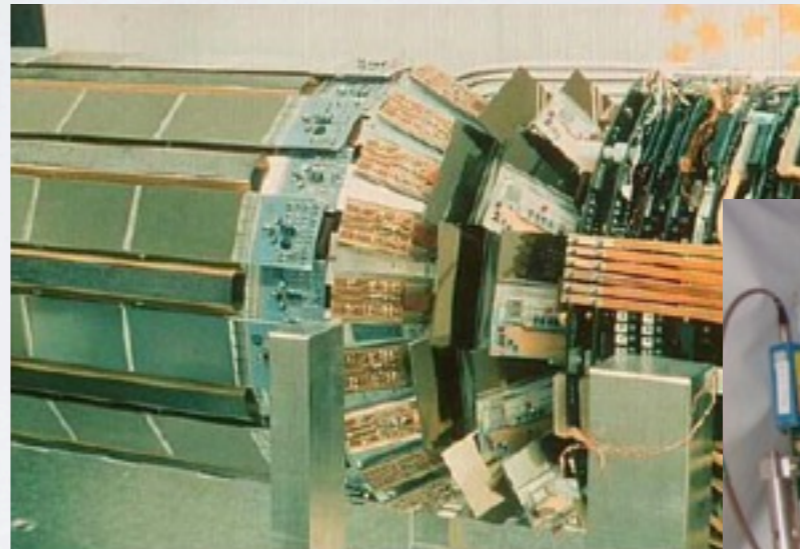
- Lots of alternatives studied by Steve Blusk (see his talk)

- Angled modules (the Angel of Amsterdam returns)

- Reduced guard ring width

- Reduced beam hole

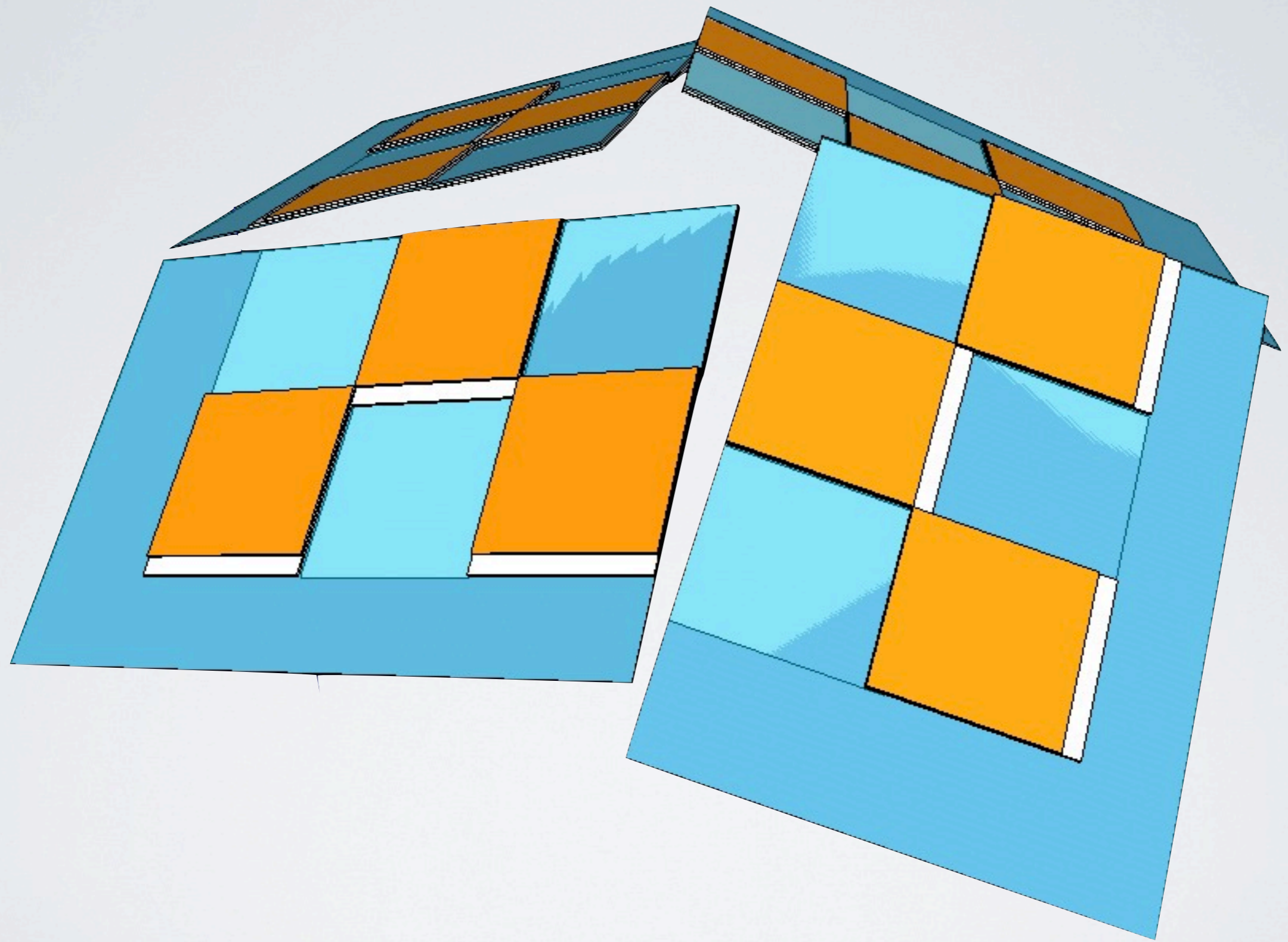
- Floating pixels



- 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