Perspective from an ECR working on R&D

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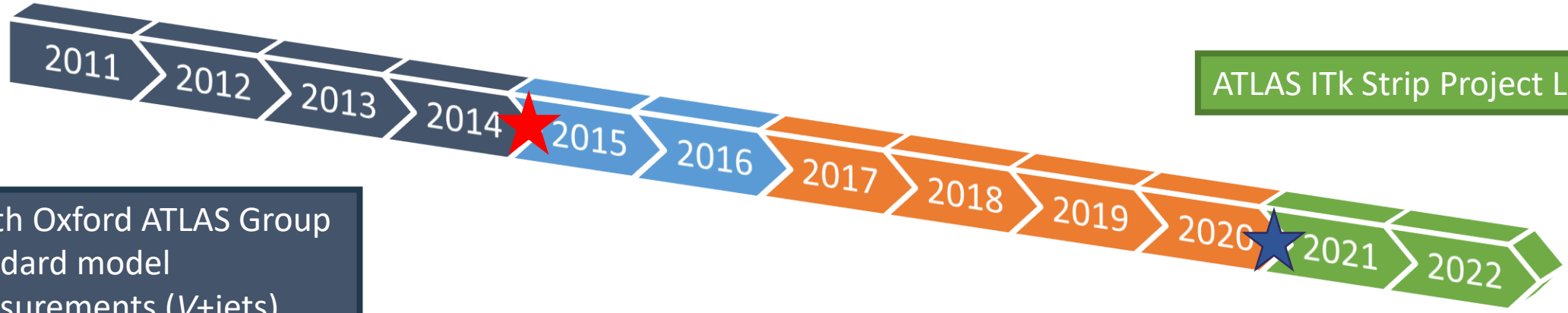
Disclaimer

- Everything here is based on my personal experiences and opinions
  - My attempt to write down some initial thoughts and initiate some discussion

Personal context

Joined STFC-RAL ATLAS Group
- ITk Strip module assembly
- Module testing/characterisation



ATLAS ITk Strip Project Leader

PhD with Oxford ATLAS Group
- Standard model measurements (*V*+jets)
- Jet energy calibration

ATLAS ITk Strip Module Activity Coordinator

★ Transition between physics analysis and hardware

★ Stepping a bit back from R&D

Transition to hardware R&D

- More hands on
  - “Tinkering”
  - Doesn’t have to be fully hands on
- Facilities/equipment needed
- Somewhat different problem solving
  - Cycles take longer
- Lots of transferable skills
  - Software, simulation etc.
- A lot of hardware physicists continually learning on the job
  - Design tools, simulation tools, FEA
- Getting into ongoing projects is one thing, future R&D is another
  - Money needed for future R&D (parts, equipment etc.)

The day-to-day

- Over the last few years have attempted to do various non-ITk side projects
  - 10-20% level on ATLAS physics
    - MC generation/validation for VJJJ – kind of worked
    - Statistical interpretation of HNL – too big scope for time
  - 10-20% level on future R&D
    - Small group of 10 or so people working “on the side”, small % of each
    - Looked doable but put on hold delivering ongoing projects
- More variety in R&D?
- R&D can require a greater degree of planning
  - Performing actual measurements/tests can be very quick
  - Requires bringing together parts/people at the right time
- Flexibility is key
  - Make use of experienced colleagues and/or engineering effort
  - Sometimes reality is you have to design something yourself

Careers

- Part of a wider discussion?
- Being a hardware person cannot hinder career progression
  - If it does, we'll never get to the next detector
  - But current lack of R&D funding may mean it does?
- Every ECR right now should be looking to do something hardware related
  - 20% level?
  - Institutes/projects should be supporting this
  - Needs to be a mix of current project delivery and future R&D
- Cannot rely on tiny bits of people to do all our R&D
  - Especially if the same people are central to the delivery of ongoing projects
- Need a long-term goal and short-term stepping stones working towards it

Some more thoughts

- Generation gap
  - There is a concerning lack of ECRs in hardware
- There shouldn't be such a gap between hardware and physics
  - Go hand-in-hand
  - Will get more out of future experiments with people bridging the "gap"
- R&D funding has basically disappeared in the UK
  - Needs to be built back up
  - Not sure we could anyway ramp up immediately even if money was there!
- UK is behind in R&D
  - Still need to deliver ongoing projects though!
- Split of effort?
  - Design efforts benefit from small groups of people with large % of FTE
  - Characterisation/testing can be larger groups of people with small(er) % of FTE
  - Testing can require facilities (irradiation, cooling etc.)
- Needs to be a change in the community structure?
  - ECRs should care about this
  - PPTAP

Discussion

- How sustainable is it to do small fractions of time on future R&D?
- How risky is it to commit to a career in future R&D?
- What is the best strategy as a community (many people giving small fractions of time - fewer people giving larger fractions) and as an individual (how do I get a permanent position)?
- How straightforward is it to start performing R&D / transition from data analysis?