Establishing a detector center or instrumentation division

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Scope

- Development of new technologies enabling future projects
- Delivery of instrumentation/detector projects
- Enabling technology transfer to tackle pressing issues, for example in green technologies, health care

Current status 1. small emerging technology development effort

- Technology
  - Some effort in digital SiPMs driven by characterization and modeling. Lack of access to fabrication facility is main limitation – some collaboration with Sherbrooke
  - Interest by the High energy physics community in MAPS and LGADs
- Funding
  - Canadian Collaboration for Integrated Detector Development (CCIDD) grant was funded at minimum level (120k$/y) by NSERC SAPES
  - Some work on the side of existing projects
  - New prospect: McDonald Institute, SFU CERC (Darren Grant), CIF IF 2025 for Innovation Driven Intelligent Detectors

Current status 2. Major effort in system development

- Core effort of TRIUMF Science Technology department
- Additional resources within NSERC MRS, McDonald Institute and SNOLAB
- Funding:
  - TRIUMF internal + charge back to CFI
  - Additional personnel hired from CFI
- Management and transparency could be improved. Difficult to tackle for part time physicists as managers

Current status 3. technology transfer

- Quite a few projects and collaborations
  - Water quality monitoring for first nation communities. Spin off of Hyper-K
  - Single Photon Air Analyzer for forest fire management with the companies Sensenet and HFR (Korea) – currently limited funding
  - Therapeuthic Isotope Imager with Gamma Ray at conceptual development stage – collaboration with Life Science
  - Detector modeling with ANSYS/Lumerical – single photon detector - MITACS fellowship funding
  - General Fusion Neutron Emission Spectrometer – High speed photon detection - NSERC ALLIANCE funded
- Translating opportunities in successful projects is hard for part-time physicists

Status summary / comments

- There is very little resources for emerging technology work
  - Some projects here and there about 1-2 FTE
  - … Emerging technology work sell well in CFI proposal if there is a breakthrough prospect
- There is never enough resources for project development
  - Sci Tech support personnel + others -> 25 FTE
- There is very very little resources for technology transfer
  - Akira + Fabrice + a few add-on through TRIUMF innovation here and there at about 0.5 FTE
  - Tech transfer prospect is critical for CFI funding. Even better if there are explicit success.

Detector center proposal – mostly about emerging technology

- Proposed early 2024
- Main aim was to safeguard resources for emerging technology development
  - That tend to be gobbled up by project development
- Made it into the 5 years plan

The detector center post-5 year plan …

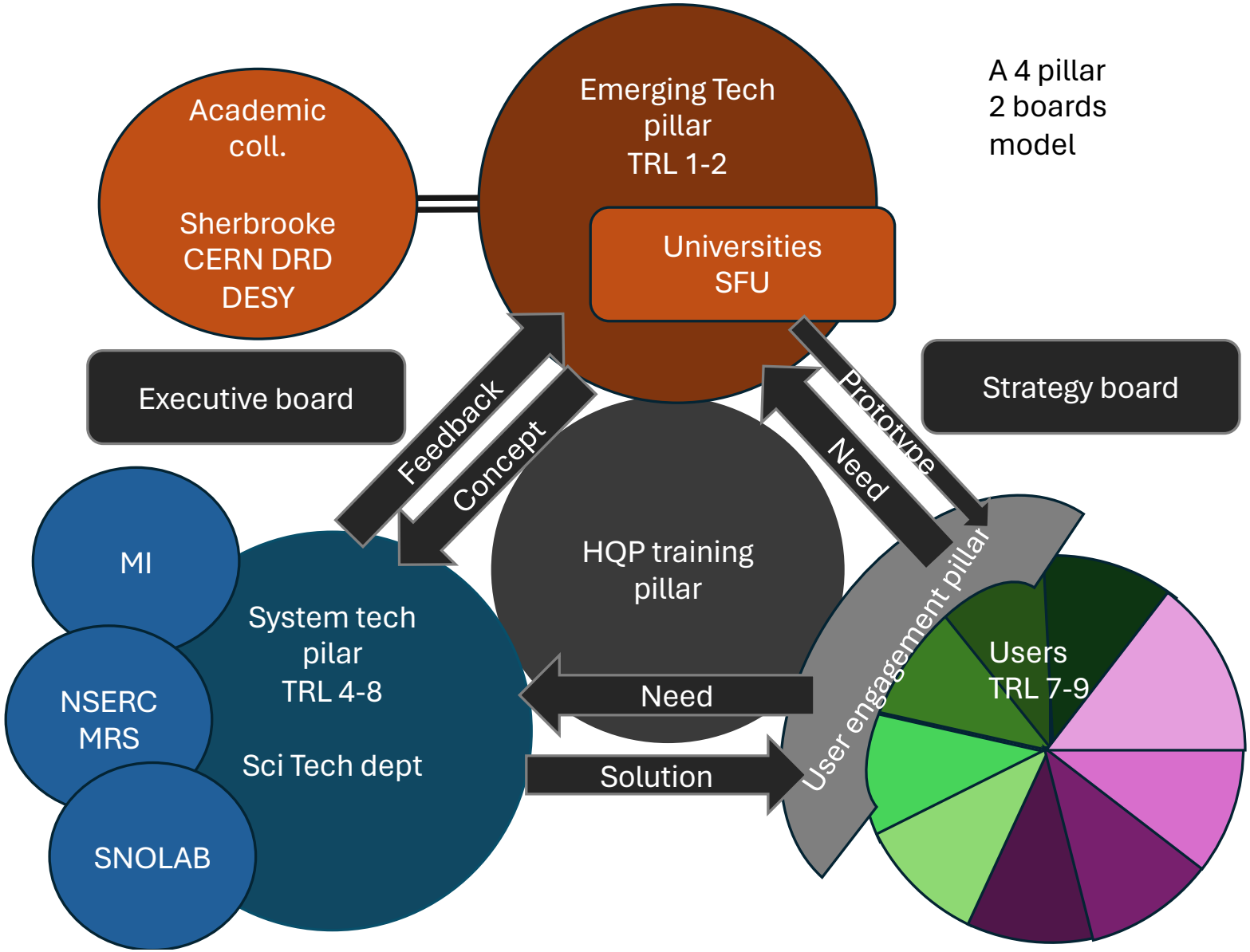
- Consolidate with quantum/precision center and Science Technology department? -> Instrumentation center
  - Pros:
    - large resource pool enables specialization, while being flexible.
    - May enable tech transfer spin off for the benefit of all
  - Cons:
    - Shared resource management and prioritization. Resources associated to group/department/project are more limited but potentially less distracted
    - Quantum/precision center is more about increasing system level resources and less about emerging technologies
    - May not safeguard emerging technology

Best solution may be an instrumentation division

- Aim 1: provide tools to deliver science (as accelerators do)
- Aim 2: research in emerging instrumentation technology
- Aim 3: transfer technology to address pressing issues
- Establish processes for effective management
  - Administrative support for transparency in decision making process and project resource allocation
  - User engagement support for scientific community and exploiting tech transfer opportunities
  - Strategic boards to assess technology and application opportunities
  - Interface with the rest of the Canadian community interested in instrumentation
- … At department level all this is hard to achieve due to lack of visibility and admin support

Can this be done?

- Funding is available outside TRIUMF – a detector center will happen in collaboration with SFU
  - Scope of center is TBD and depends on TRIUMF engagement
  - If engagement limited, focus will be on Astro-particle physics + collider and associated tech transfer applications
- Space is a major issue
  - Most new resources may end up at SFU because of lack of space at TRIUMF
  - … Pushing for space is hard to do at dept level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