CFHT, CFIS, and the future

Alan McConnachie
NRC Herzberg
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• Arrival of Subaru/HSC required MegaCam to concentrate on its niches: u band, narrow-band filters
  • 2017+: CFIS; Vestige (MegaCam), CFHT IR parallax (WIRCAM), SLS (Spirou); SIGNALS (Sitelle)
• Also a couple of “effectively Large Programs”: Pristine, CLAUDS
The Canada-France Imaging Survey (CFIS)

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- Large Program started in 2017A, that grew out of previous LP Luau (Legacy for the u-band all-sky universe; 2015-16)
- u and r-band imaging:
  - u band: 24.4 @ SNR=5, 10,000 sq. degs
  - r band: 24.85 @ SNR=5, 4,800 sq. degs
- 321 night request
  - Allocated 271 nights in 2016LP call
  - Additional 50 nights requested in 2018LP call
  - Top ranked proposal, but SAC decided not to allocate any time
  - Instead, the 50 nights are going to be used for a “Completion Policy” for the current LPs
CFIS-r sky coverage completed as of September 2018

- Galactic plane
- BOSS
- CFIS-r: 10,000 deg.² with priority to DEC>25 deg.
- CFIS-r + Pan-STARRS-iz + JEDIS-g: 4,800 deg.² [Euclid North]
- CFIS-r covered with 1 exposure (1st pass): ~1750 deg.²
- CFIS-r covered with 2 exposures (2nd pass): ~1615 deg.²
- CFIS-r covered with 3 exposures (full depth): ~1501 deg.²

CFIS-u sky coverage completed as of September 2018

- Galactic plane
- CFIS-u: 10,000 deg.² with priority to DEC>25 deg.
- CFIS-u + Pan-STARRS-iz + JEDIS-g: 4,800 deg.² [Euclid North]
- CFIS-u covered with 1 exposure (1st pass): ~2524 deg.²
- CFIS-u covered with 2 exposures (2nd pass): ~2126 deg.²
- CFIS-u covered with 3 exposures (full depth): ~1838 deg.²

Luau full depth with 3 exposures: 2608 deg.² (2015–2016)
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   (leverages the u-band sensitivity)
B. Probing Dark Matter with Weak Lensing
   (leverages the LSB sensitivity)
C. Euclid
   (leverages the depth/area)
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UNIONS is the Ultraviolet Near-Infrared Optical Northern Survey, and is a merger of the Canada-France Imaging Survey (CFIS) with the PanSTARRS consortium at the IfA:

- CFIS is obtaining deep u and r band imaging of the northern hemisphere
- PanSTARRS is obtaining deep i and z band imaging of the northern hemisphere (4,800 sq. degs)
- An initiative underway at the IfA may start obtaining the complementary g-band imaging of the northern hemisphere using Subaru HyperSuprimeCam
- The LSST of the north for the static sky…!
A. CFIS/UNIONS is a strategically important platform for Canada in wide field astronomy

- UNIONS will likely become the major optical legacy survey of the northern skies
- Already gained access of the community into Euclid (everyone who said they wanted in is in)
- Obvious training set for LSST science and data challenges (static not transient sky)
- The weakest link in UNIONS is CFIS: right now we are not going to complete the survey as envisioned - little legacy value in a bunch of discontinuous patches with varying subsets of ugriz
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• B. CFHT is still a powerful scientific facility telescope
  • For wide field astronomy, Subaru/HSC means it needs to focus on key areas for biggest impact
  • Canadian PI pressure on CFHT is ~2 - 3
  • CFHT is a PI-telescope, and a LP-telescope, and is for instrument specialization, and has nearly doubled into instrumentation suite, and is also maybe going to change to a 11m
  • What is CFHT’s (i.e., the SAC and Board’s) strategic vision (cf. Gemini)? Ultimately, this should represent the vision of the community.
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• **C. Canada needs a plan for CFHT in the 2020s**
  • The science impact of CFHT has been incredible, and it should continue to exist if it is doing world-leading science.
  • The SAC has allocated time to LPs to continue until ~2021. What happens after that?
  • Canada needs to look at the community science potential of CFHT in the 2020s and plan accordingly. We don’t need to wait for the LRP to start this process
  • Should it (1) stay the same, (2) reinvent, or (3) die?