

The Canada- France Imaging Survey

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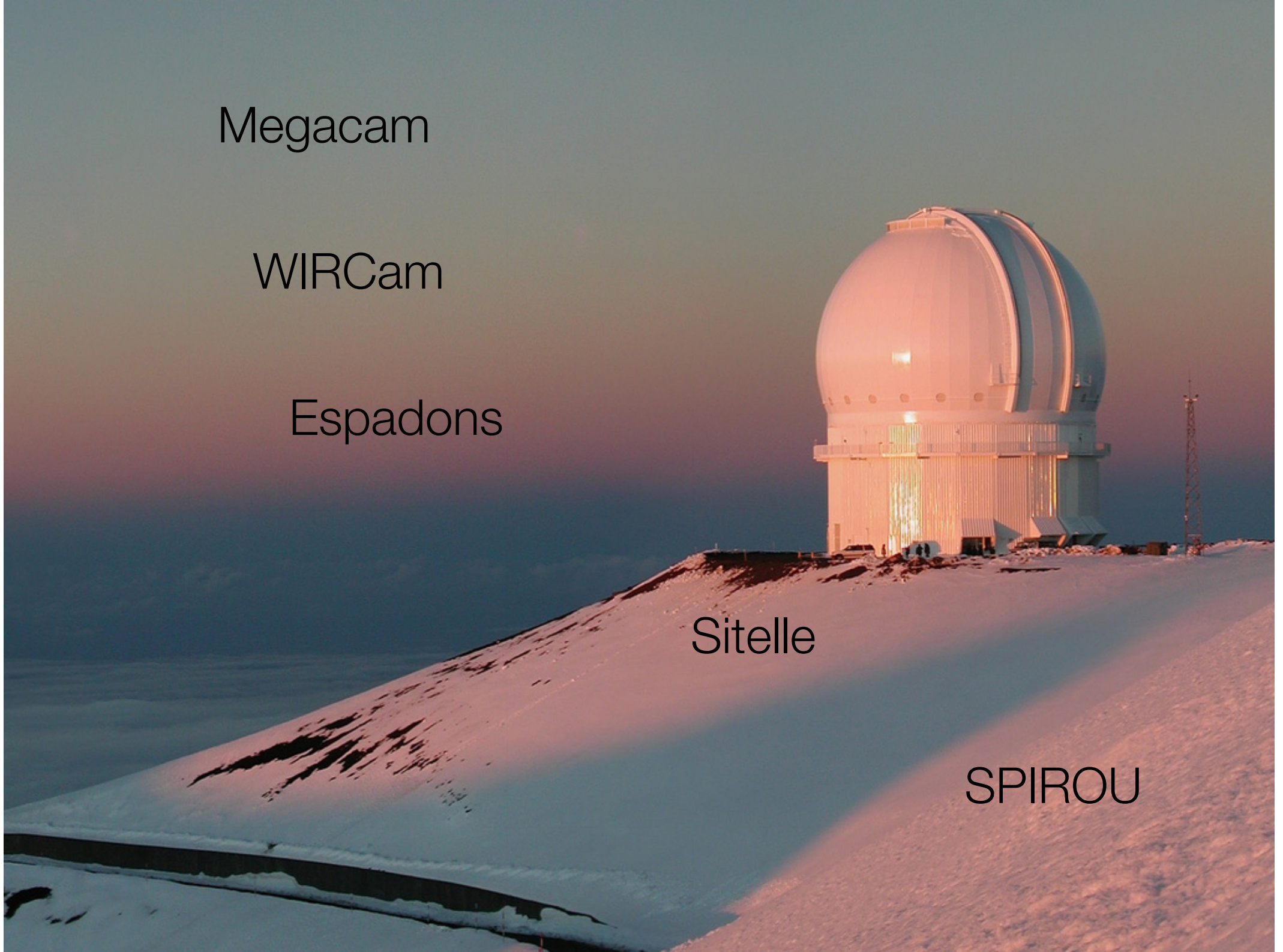
Megacam

WIRCam

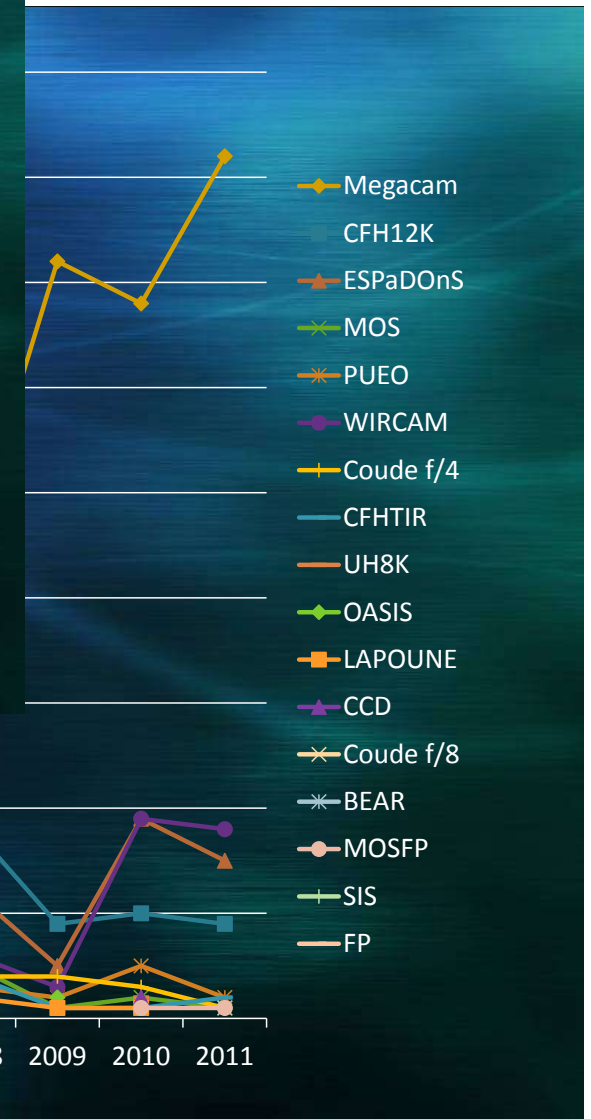
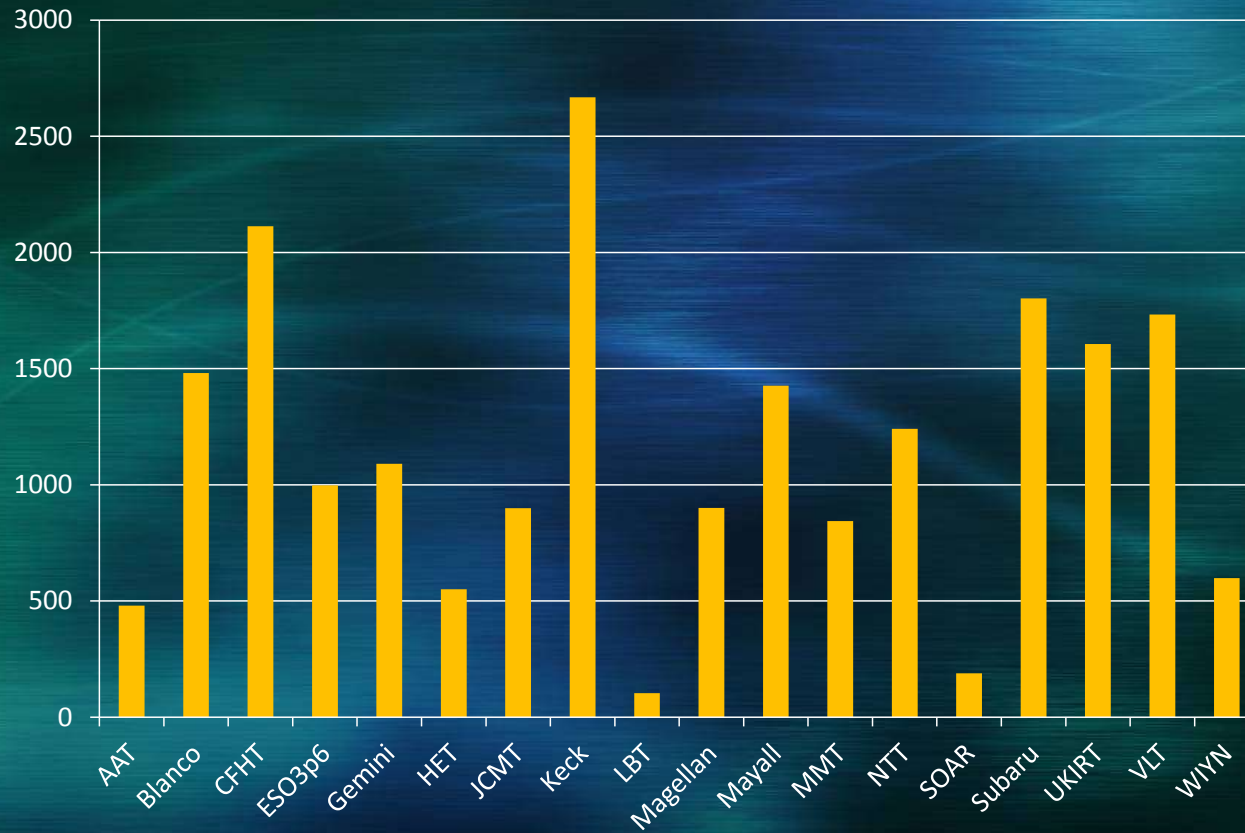
Espadons

Sitelle

SPIROU



Total Impact per Telescope: 2007-2011



Megacam

Niche for Megacam :
VERY wide-area imaging

WIRCam

Espadons

SuprimeCam

Imacs

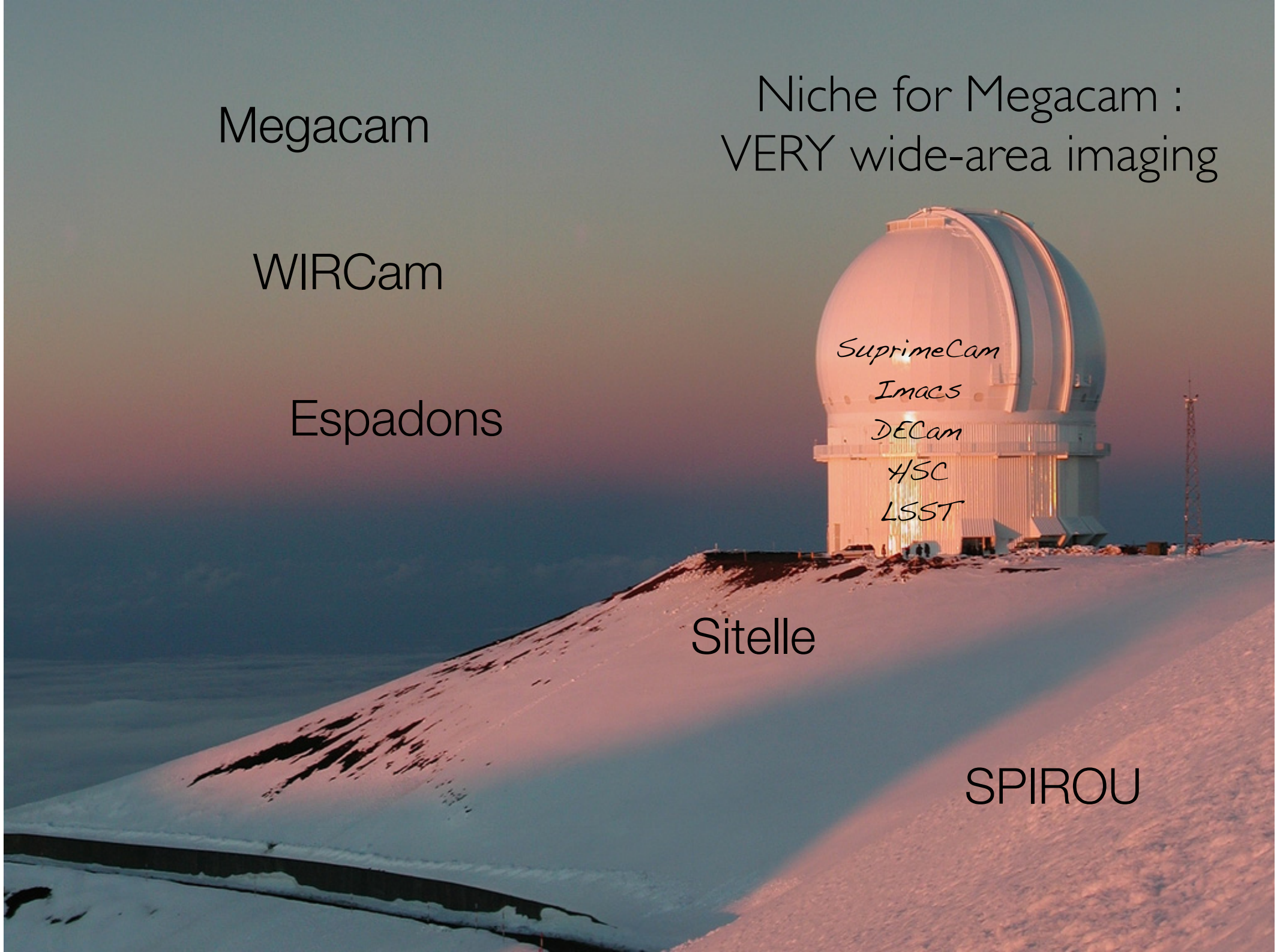
DECam

HSC

LSST

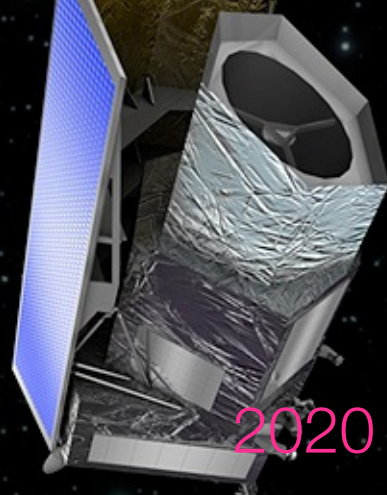
Sitelle

SPIROU

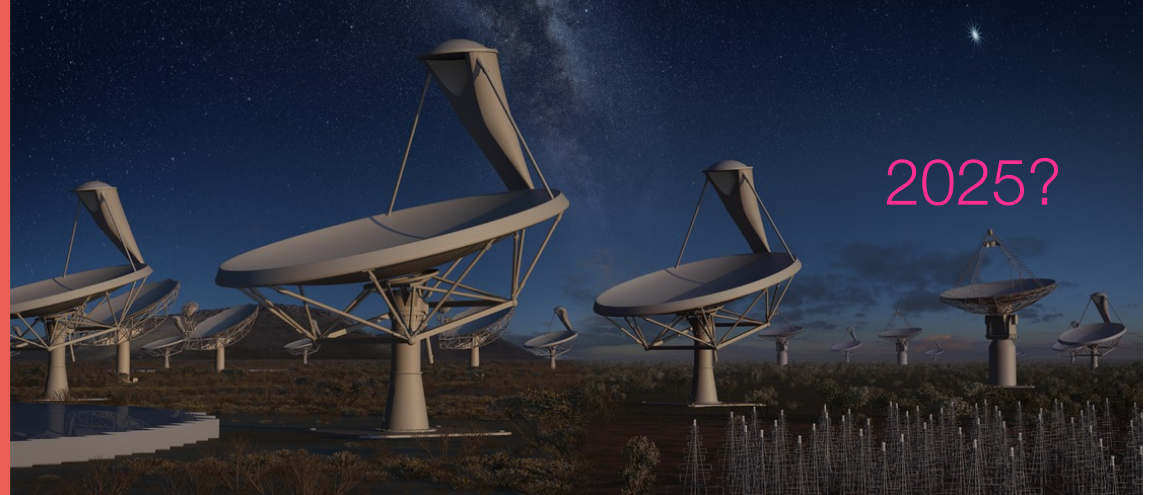




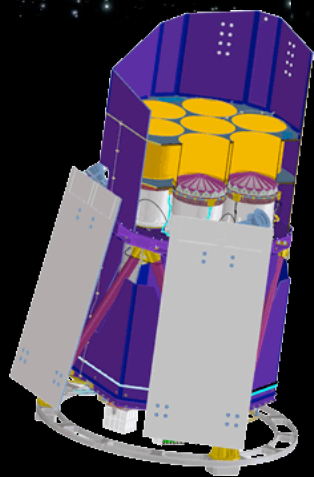
2013



2020



2025?



2016



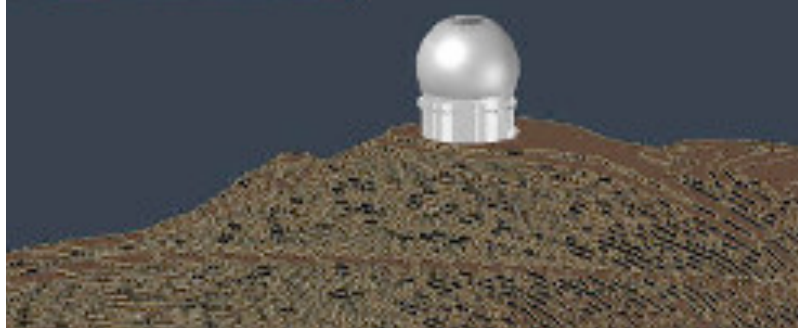
2022



2022?



2022?



2022?



2020?

Missing: Northern sky deep imaging

- PanSTARRS (no u-band)
 - Gaia (improved metallicities & distances)
 - Euclid (photo z's, morphological reference)
 - eROSITA (source identification)
 - MSE (target selection)
 - TMT (follow-up of all above)
-
- Ideally to LSST depth... but we can get half-way there with CFHT (and LSST is still a long way off).

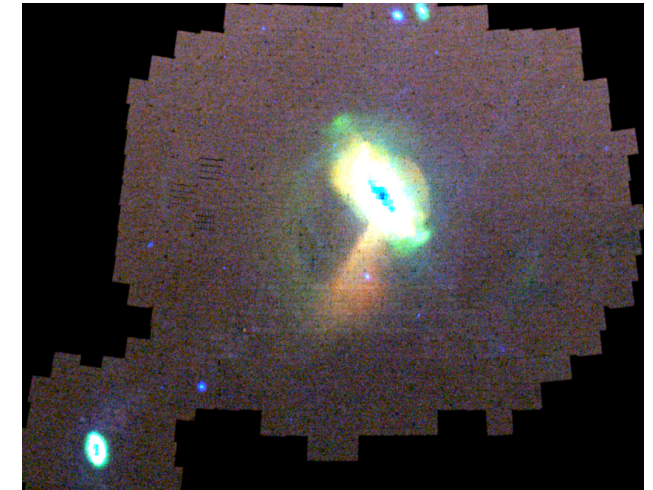
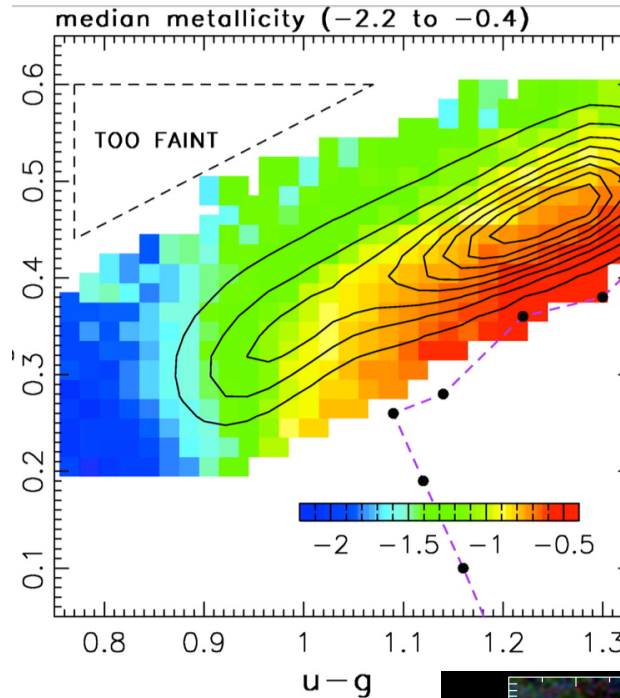
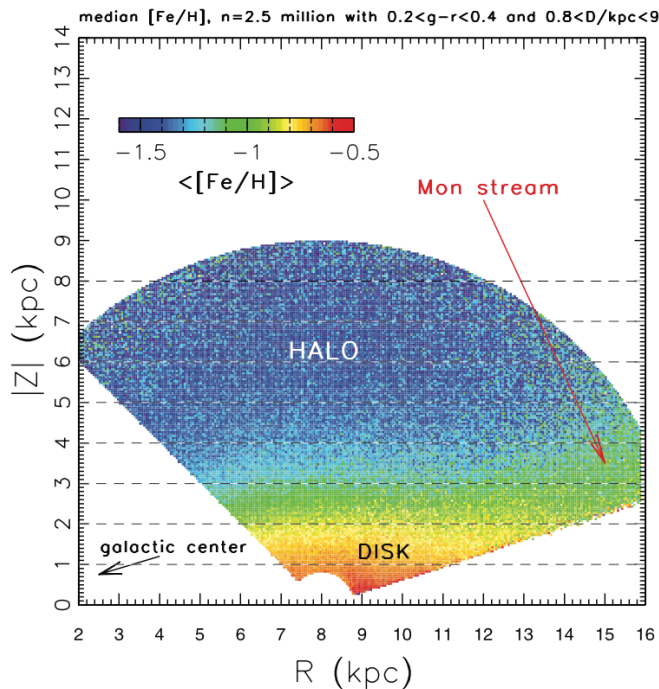


CFHT 2012 calendar ©

Gaia + CFHT-LP “Luau” + CFIS

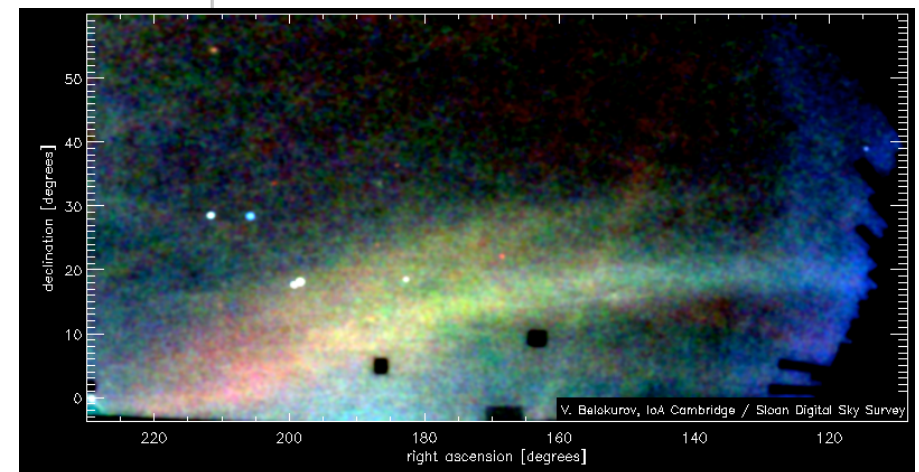
Ivezic et al. 2008, SDSS

M31



Milky Way - SDSS

- Use SDSS photometric metallicity method to probe much further out in halo than Gaia
- Discover distant sub-structures in Milky Way, and provide complement to Gaia data
- 100s of follow-up studies (SDSS structures)



We have a very exciting opportunity to build a survey that will enable heaps of next-gen science

Canada-France Imaging Survey (CFIS) ?

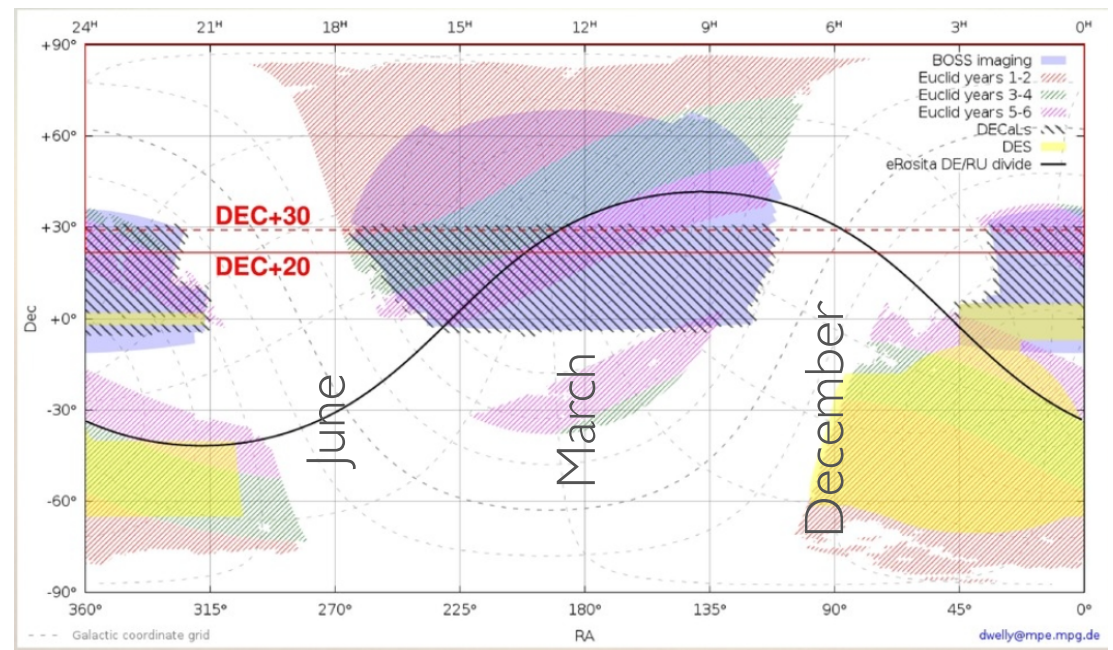
- Unique to CFHT community.
- From a non-Euclid french perspective (mine), this is a no-brainer.
 - I get SDSS + 2 mags, with new LSB sensitivity
 - I get extra parameters to enhance Gaia stellar metallicities, distances, SEDs.
 - I get Euclid morphological information for everything.
 - Together with Euclid, I get similar information as in the low-z SDSS but out to $z \sim 1$.
 - We get to follow all the interesting populations thus found with MSE. (Does MSE even make sense without such a survey to supply targets???)
 - Someone (not me) gets to study the most interesting of these sources with TMT...
- How about for your science?

CFHT constraints

- France and Canada have only 55 nights each per semester; 5.5 Megacam hrs/night
- a large fraction of French time (~60%) is already promised to Large Programmes (LPs) up to 2016B
- weather is highly variable from year to year (see JCC's slides)
- CFHT is Canada's principal optical observatory... some fraction of PI time needs to be maintained
- New instruments coming:
 - 2015: Sitelle
 - 2017 (nominally) SPIROU

CFIS constraints

- CFIS is very heavily centred around the North Galactic Cap, i.e. semester A
- Ideally, need dark time. But u,g,i choice gives some balance of dark vs bright time
- 6100 sq degrees u,g,i : 475 nights
- 8.6 years of all F-time in A semesters ... (complete CFIS in 2026!)
- So collaboration with Canadian (and other?) partners is essential
- CFHT “Luau”: 64 nights in u-band
- Sharing CFHT with other projects (e.g. PIs) is more efficient



Heavy manpower requirements.
Consider data release policy...

Canadian response to CFIS (my take on this!)

- Many Canadians continue to view CFHT as an essential part of their general-purpose toolkit.
- Realise that CFHT is ageing, and that large surveys will give it a competitive edge.
- But they could (happily) continue on as at present: SPIROU is viewed as largely a French-imposed project. Previous CFHT Euclid proposal was perceived likewise.
- Strong ambition by many to transform CFHT into MSE (Maunakea Spectroscopic Explorer) as rapidly as possible.
- Many people are convinced that CFIS is a sensible plan, leading to MSE.
- Only a minority of the CFIS enthusiasts are strongly interested in Euclid
- Concern that CFIS and SPIROU surveys will derail MSE plans.

My take-home message

- Between archival data and “Luau” ~20% of the CFIS data will already be in-hand before 2017A
- It seems likely that a CFIS proposal will need to be written during 2015. The Canadians are particularly firm on this requirement as part of the “due process” in approving such a project.
- I’m convinced that CFIS is scientifically completely compelling as part of the Euclid ground segment. But the stand-alone science (some obvious) will need to be developed, especially with Canadian leads.
- Some technical challenges (especially in regard to scheduling) need to be fully explored to demonstrate feasibility. Can we take (essentially) all NGC time?
- With an understanding and respect for the needs and concerns of our Canadian partners and other CFHT communities, we can almost certainly get CFIS to work.