

Status report of WISHES

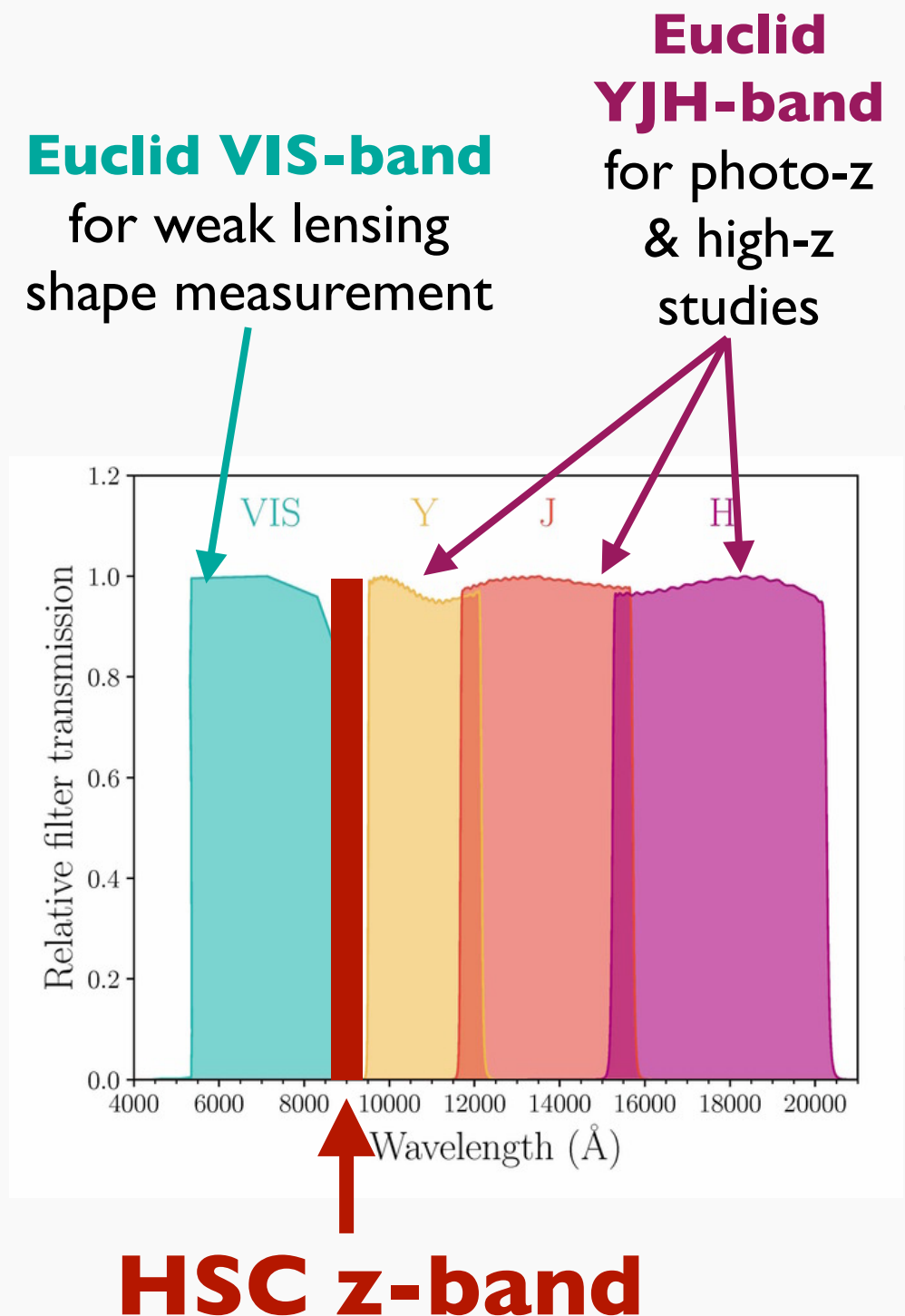
Masamune Oguri

Center for Frontier Science, Chiba University

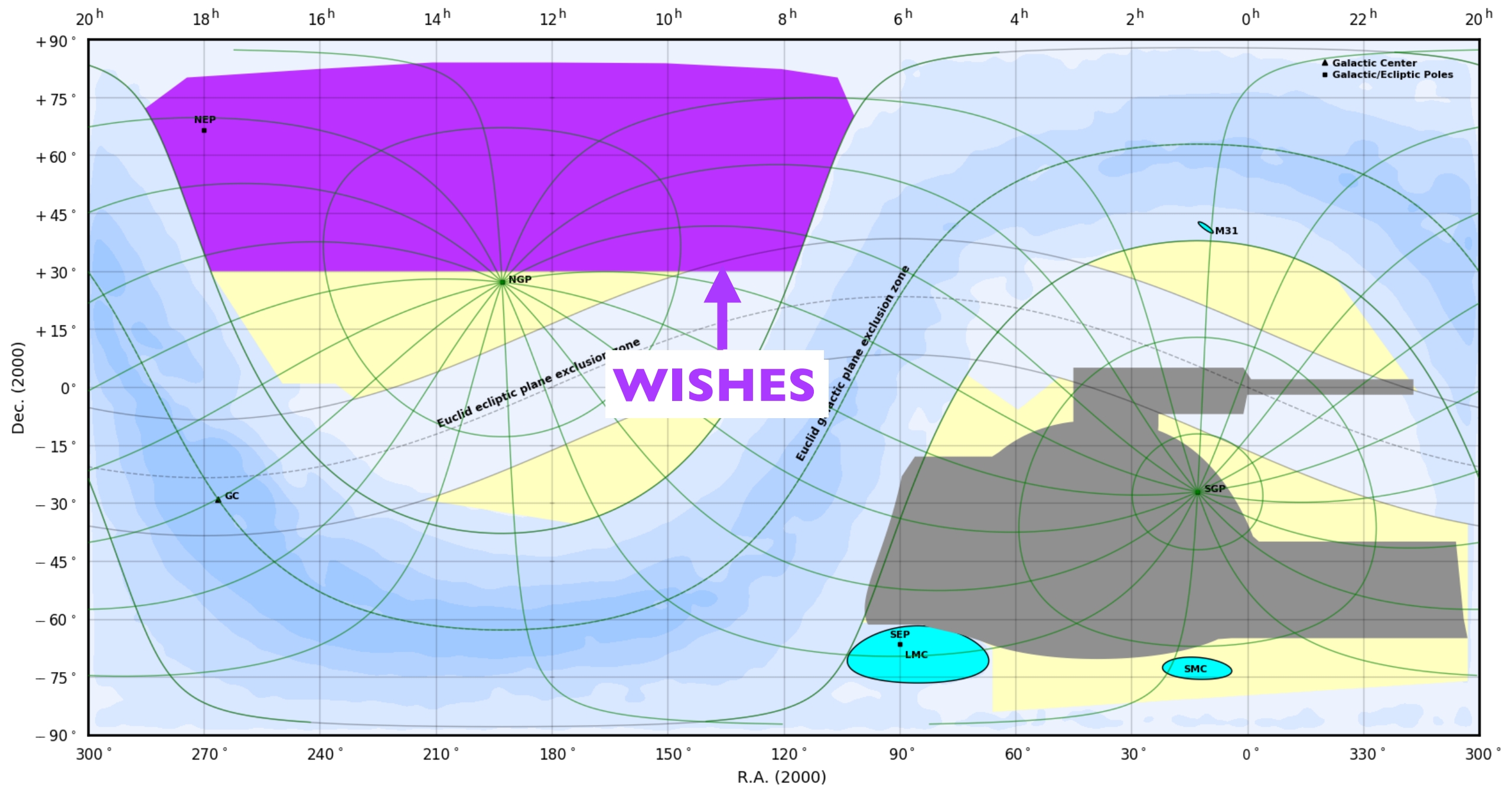
on behalf of the WISHES/UNIONS team

WISHES for Euclid

- Euclid satellite requires ground-based imaging for mission goal
- HSC z-band imaging survey (**40 nights, S20B-S23A**)
- improve photo-z of galaxies for **cosmic shear** to acceptable level, enable studies of **high-z quasars** and **clusters**



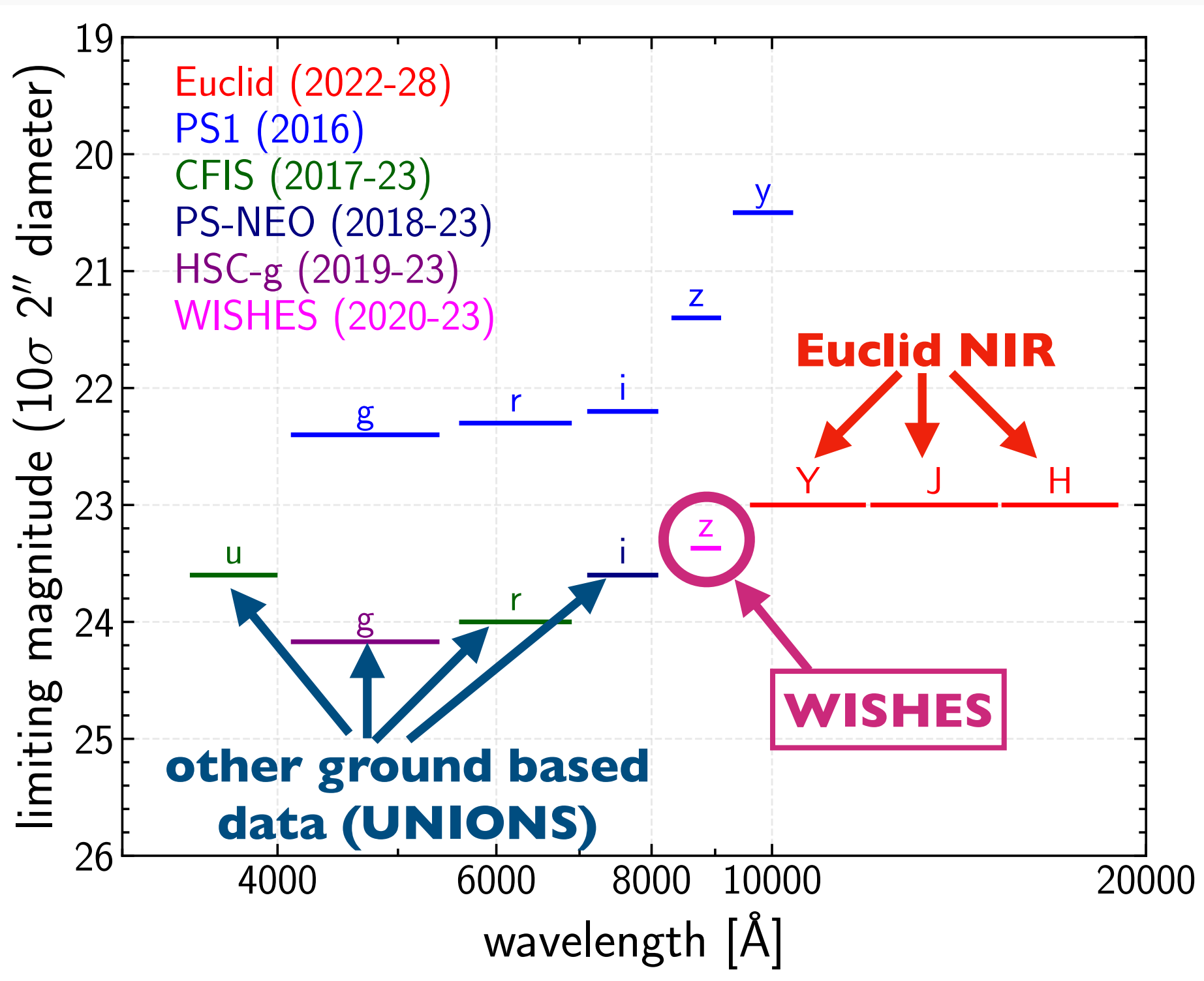
Survey footprint



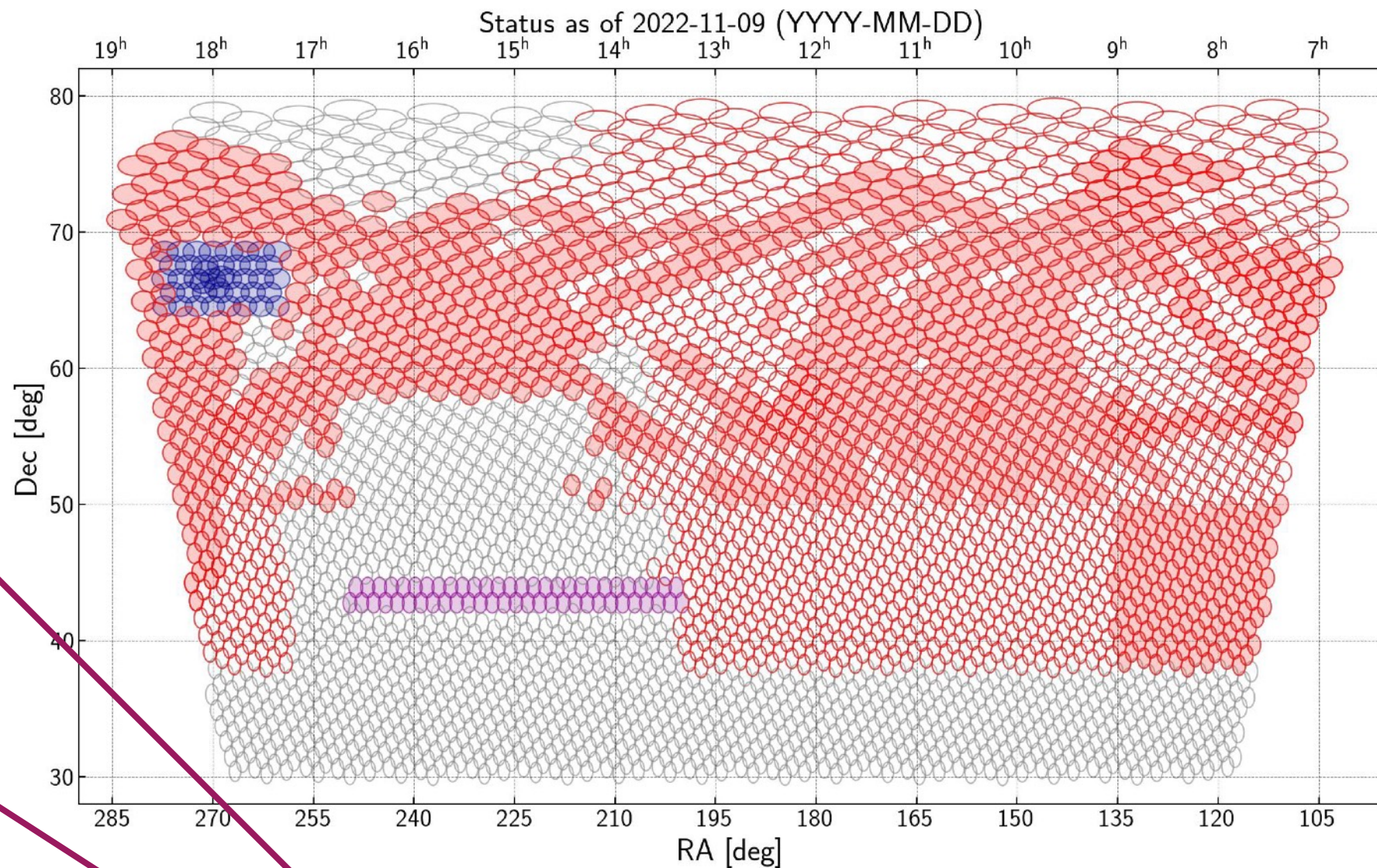
HSC Northern-hemisphere Ultra-Wide Survey footprint (HSC-NUWS) over the Euclid Wide Survey

- WISHES [z] & UNIONS (CFHT [u,r] + Pan-STARRS [i] + HSC [g]) : 4,500 deg.²
- Euclid wide space survey : 15,000 deg.² [Y,J,H + morphology + spectroscopy]
- DES [g,r,i,z] : 4,500 deg.²
- Euclid exclusion zone : 26,000 deg.² [galactic+ecliptic planes + dust]

Target depth



Current status of observations



red filled
circles:
observed
pointings

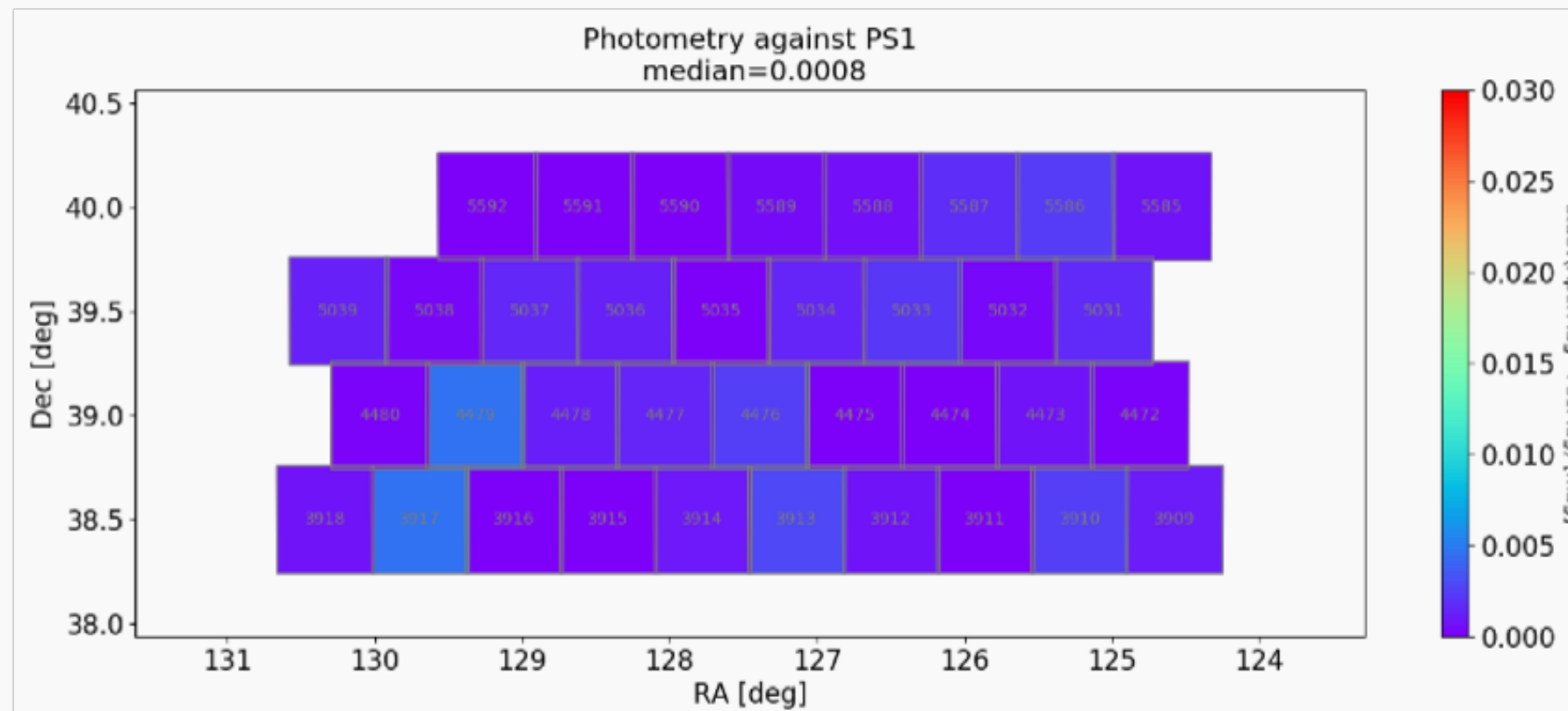
requested
carryover
in S23B
and S24A

**TUE
trouble**

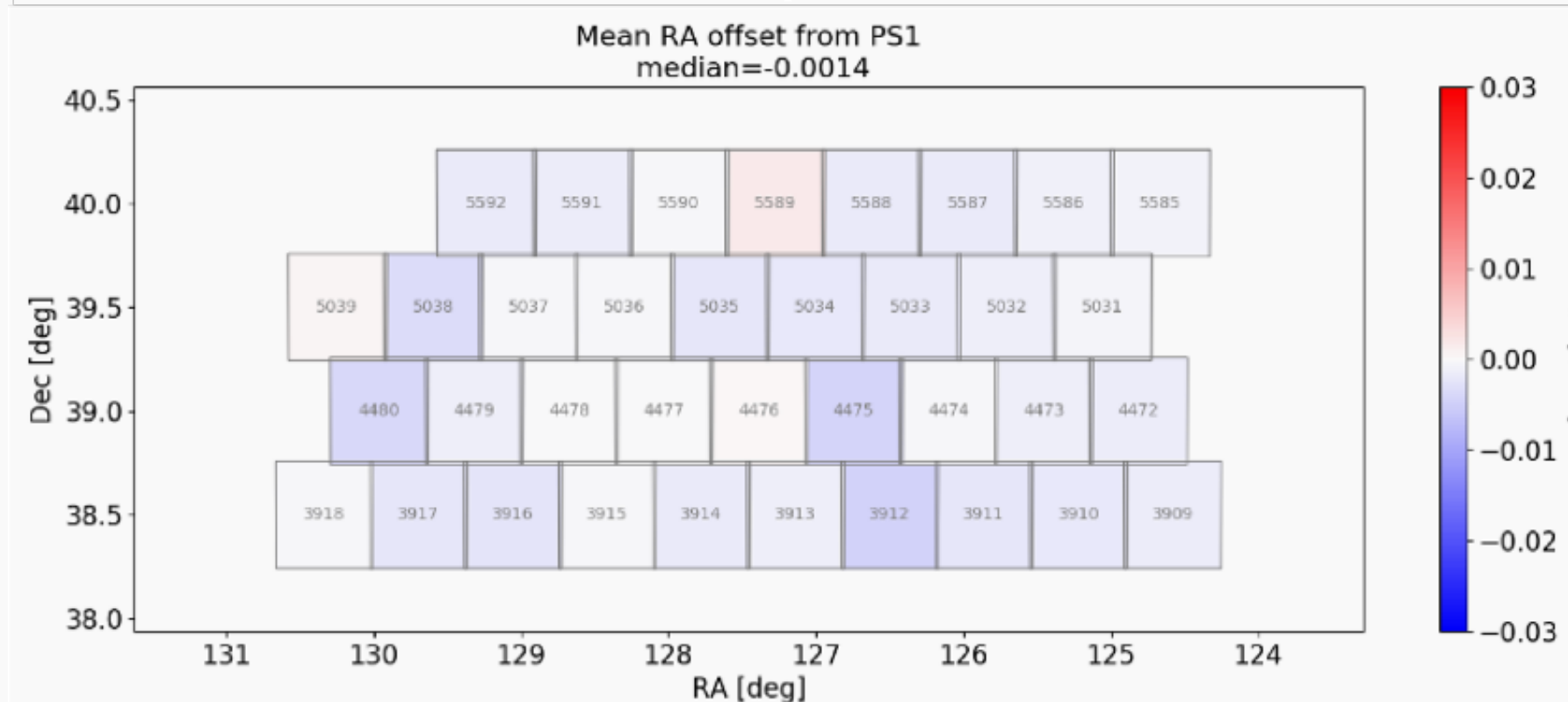
**bad
weather**

- ▶ S20B completion rate $361/252 = 143\%$ (this semester) $361/252 = 143\%$ (cumulative) $361/3014 = 12\%$ (overall)
- ▶ S21A completion rate $82/753 = 11\%$ (this semester) $443/1005 = 44\%$ (cumulative) $443/3014 = 15\%$ (overall)
- ▶ S21B completion rate $55/252 = 22\%$ (this semester) $498/1257 = 40\%$ (cumulative) $498/3014 = 17\%$ (overall)
- ▶ S22A completion rate $375/753 = 50\%$ (this semester) $873/2010 = 43\%$ (cumulative) $873/3014 = 29\%$ (overall)

Quality assessment



good quality,
satisfy
requirements



by H. Furusawa

UNIONS



Hawaiian
Islands



Pan-STARRS
2 x 1.8m

CFHT
3.6m



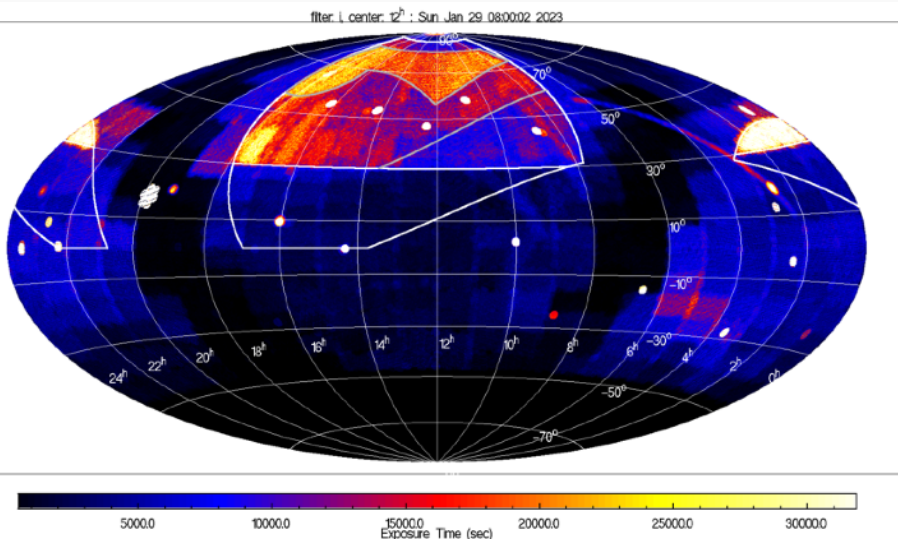
Subaru
Telescope
8.2m

from UNIONS wiki

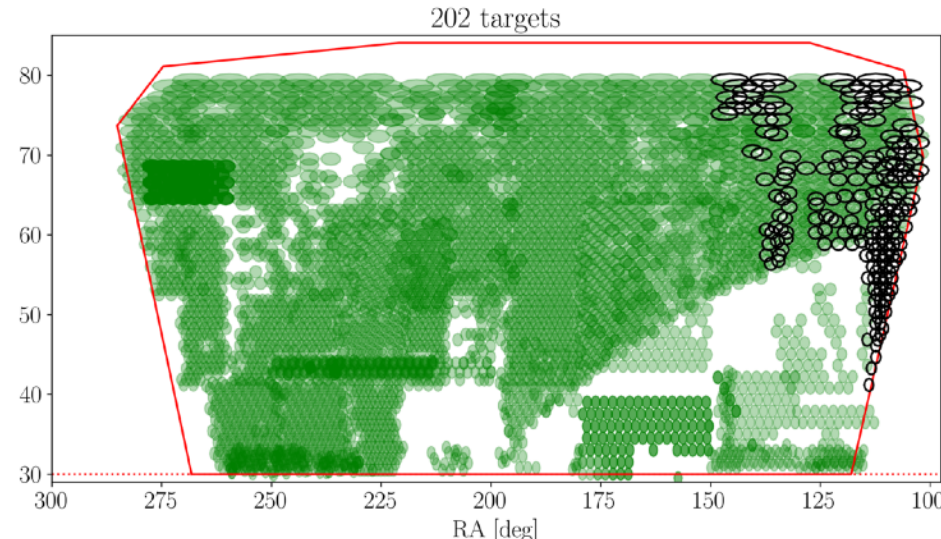
UNIONS = CFHT + Pan-STARRS + Subaru = Hawaiian alliance !

UNIONS: Survey progress

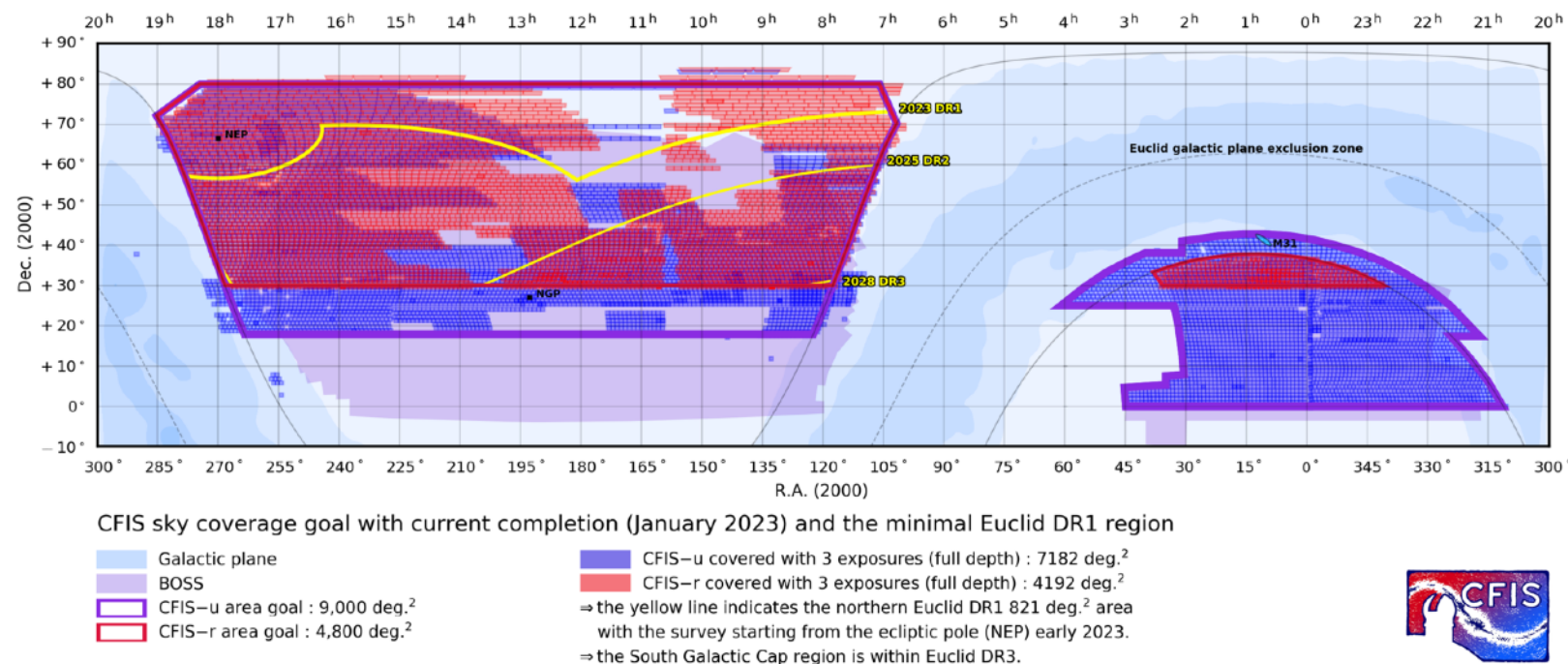
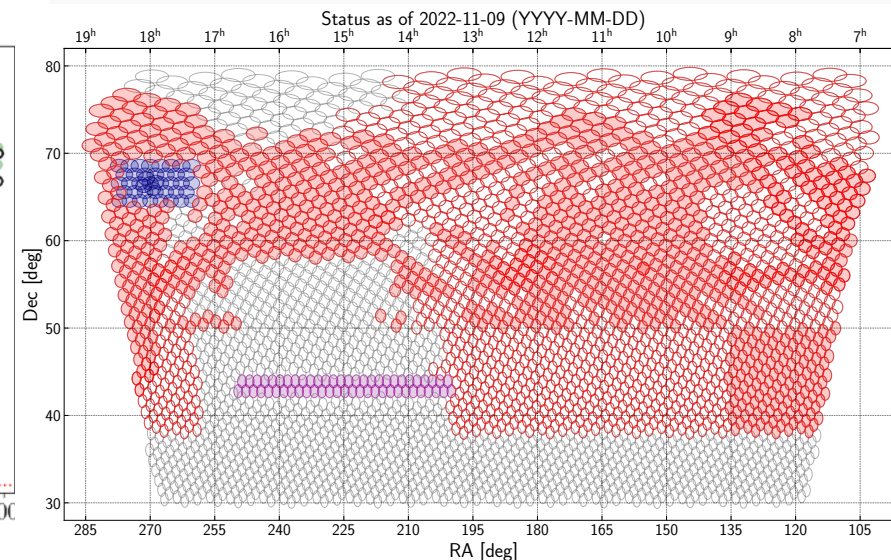
Pan-STARRS i



Subaru/WHIGS g



Subaru/WISHES z



CFHT/CFIS
u, r

courtesy of J.-C. Cuillandre, K. Chambers, E. Magnier, M. Hudson

Data access at CADC (CANFAR)

Once access is granted through the collaboration, images and catalogs can be downloaded at the main data page accessible via the CADC: <https://www.cadc-ccda.hia-ihc.nrc-cnrc.gc.ca/en/community/unions/csky.html>

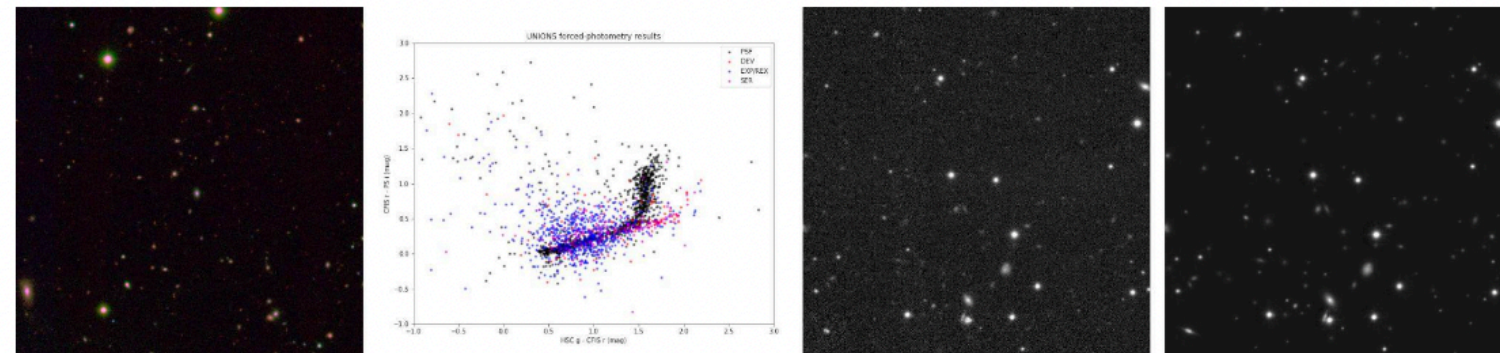
UNIONS Graphical Search Tool

Centering
RA: 118.168945
Dec: 59.205936
Zoom: 2
Object: M101

Background
☐ None
☐ Google Sky
☐ r-band LSB
z1: 6
z2: 100
gamma: 2.2

Overlay
☒ Coordinate grid
☐ Images
☐ Tiles
☒ CFIS-u
☒ CFIS-r
☐ CFIS-LSB-r
☐ Pan-STARRS-g
☐ Pan-STARRS-r
☐ Pan-STARRS-i
☐ Pan-STARRS-z
☐ HSC-g
☐ WISES-z
[Get Images/tiles](#)

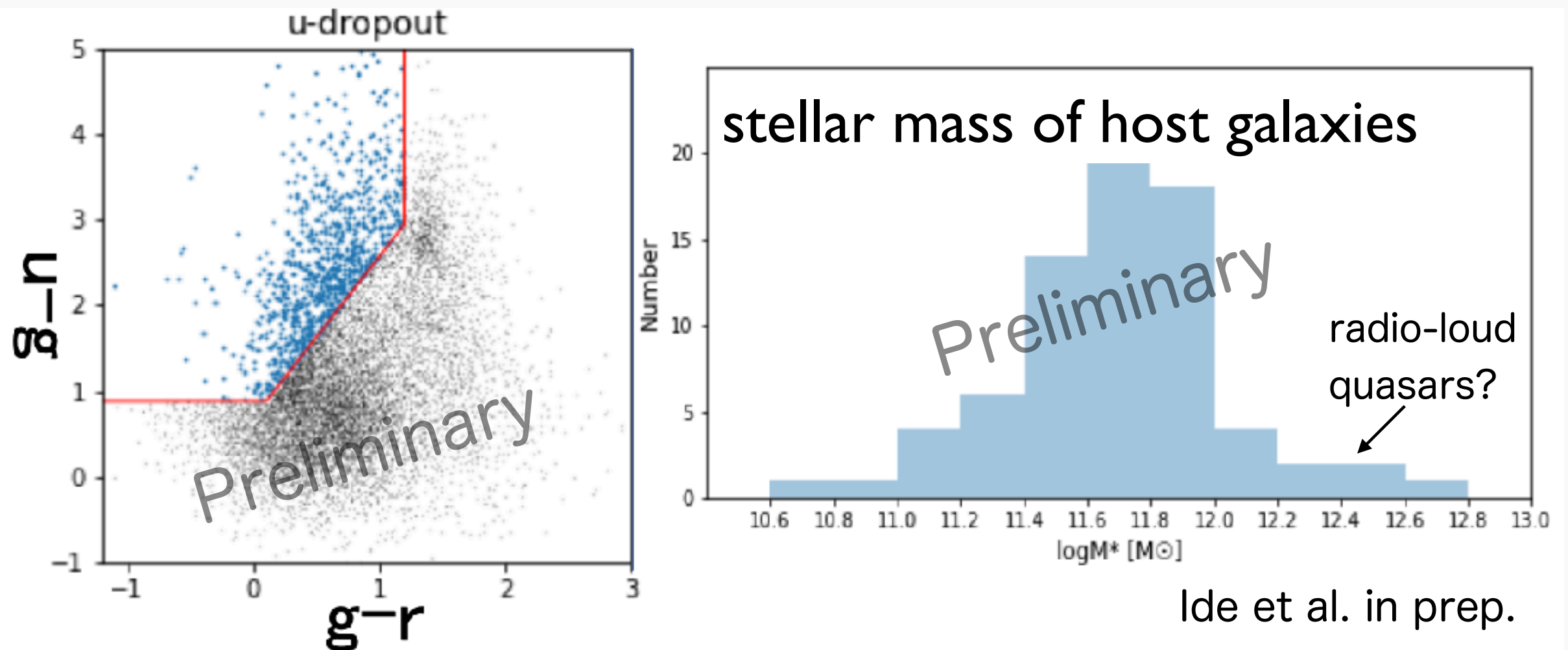
CADC/CCDA
For questions concerning these webpages, please contact the CADC (support@canfar.net).
For questions about the data itself please contact the data processors: Stephen Gwyn (stephen.gwyn@nrc-cnrc.gc.ca), Eugene Magnier (eugene@ifa.hawaii.edu) Hisanori Furusawa (furusawa.hisanori@nao.ac.jp)



Left: Seeing and PSF mismatch between Pan-STARRS on Haleakala (in green) and CFHT and Subaru on Maunakea (blue and red) highlight the need for a forced photometry approach like Tractor or HSCpipe. Center left: Tractor color-color diagram of all fitted sources in a small sky area observed by the different telescopes, the stellar locus (black dots) is tight, pointing to a solid match of the various datasets. Right side: a CFIS-r image and the Tractor image of the PSF and galaxies models derived for each CFIS-r source.

- Image stacks and catalogs of point sources and distant (small) galaxies are the basis of our internal DRs

Science using u-band



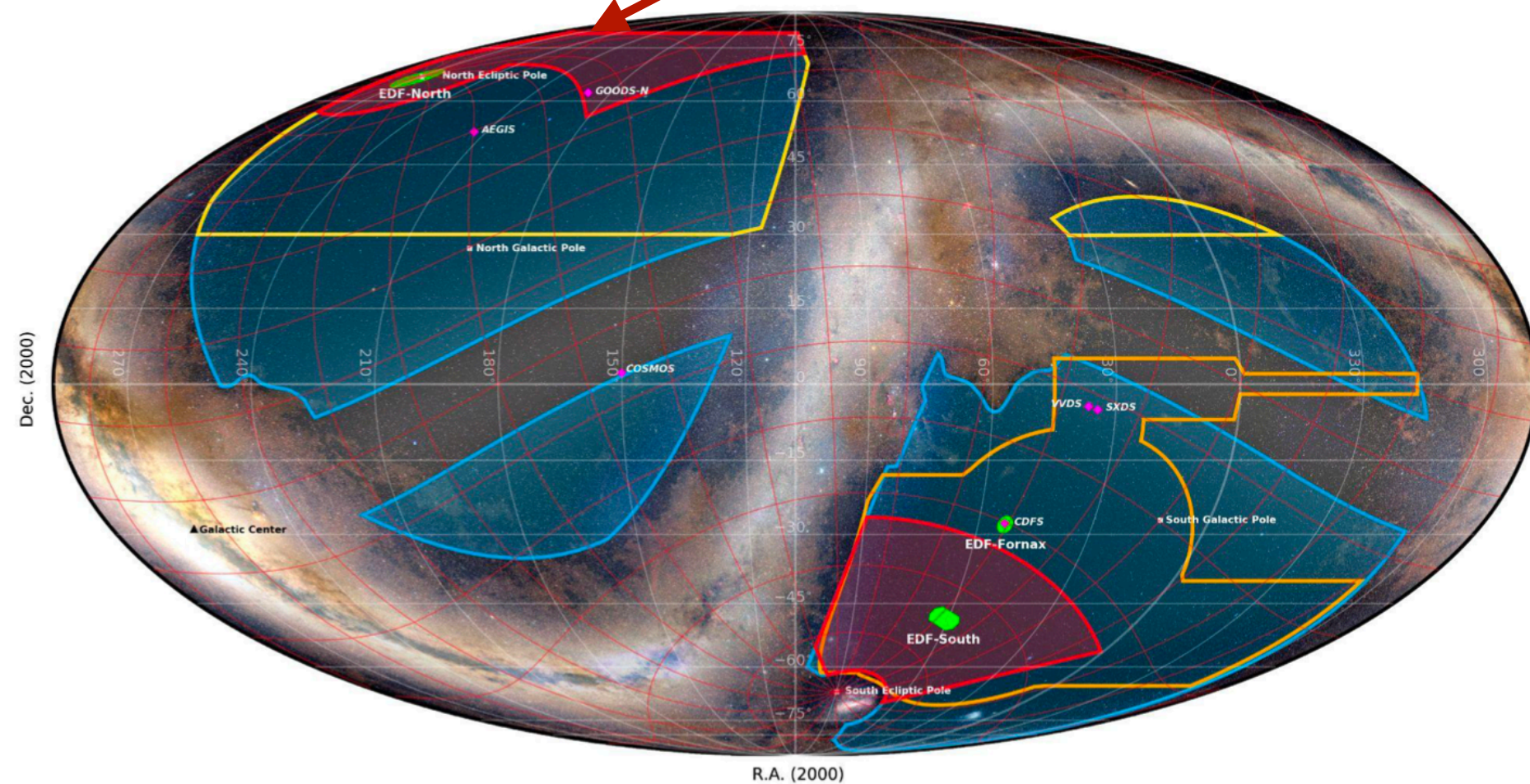
- cross-correlation of u-dropout galaxies and FIRST radio data to construct a large sample of radio galaxies at $z \sim 3$

Status of Euclid

- telescope and instrument more or less ready
- original plan to use Soyuz for launch was canceled due to Russian invasion of Ukraine (2022 Feb)
- ESA decided to negotiate with SpaceX to use Falcon9 as a launcher (2022 Nov)
- contract signed (2022 Dec)
- Euclid will be launched as soon as 2023 July

Euclid survey region

DR1 region
(Dec $\gtrsim 55$ deg)

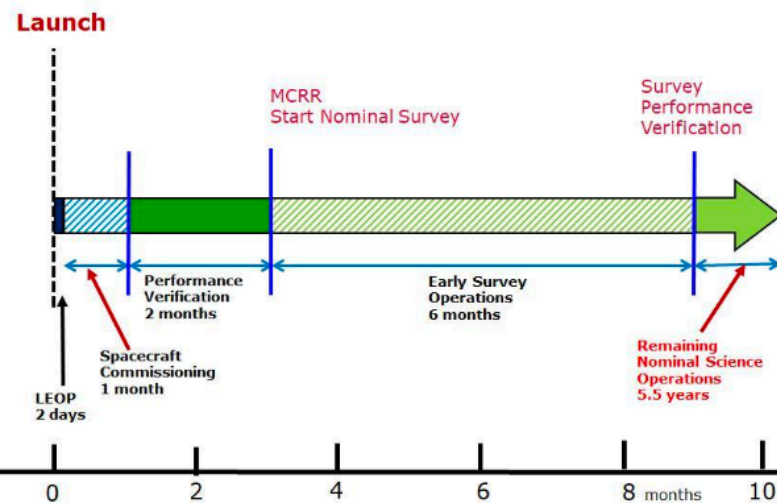


The Euclid Wide Survey DR1 area maximizing the overlap with DES : North = 821 deg², South = 1657 deg² [Mollweide Celestial]

- Euclid Wide Survey region of interest : 17,354 deg²
- Euclid DR1 area, 2023 : 2500 deg²
- DES, griz, 2013–19 : 4500 deg² overlap with the region of interest
- Euclid Deep Fields [total 53 deg²]
- UNIONS, ugriz, 2017–24 : 4861 deg²



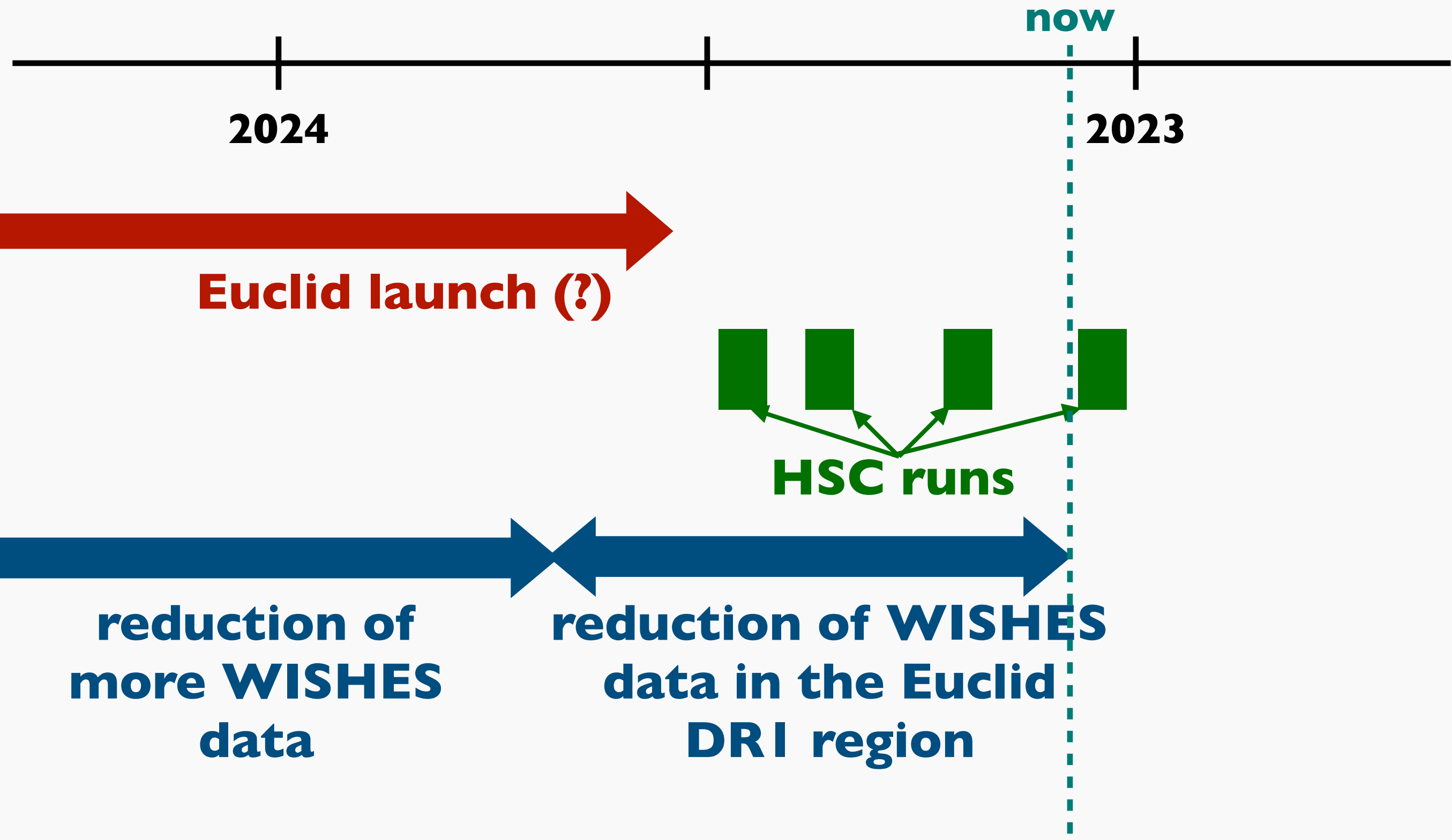
Background image: Euclid Consortium / Planck Collaboration / A. Mellinger



Provided by R. Laureijs, ESA

courtesy of J.-C. Cuillandre

Timeline



Summary

- WISHES is an HSC z-band imaging survey over 4,500 deg² of the northern sky
- survey and analysis ongoing
- delay of progress of observations, extension requested
- WISHES/UNIONS is open to any Japanese researches just like HSC-SSP