Deep Fields Planning

- At this meeting:
  - each breakout group would aim to identify key science drivers, and map these to desired observational capabilities
  - summary session would capture synergies and differences
- After this meeting (near-term):
  - white papers laying out in more detail the science drivers and the necessary observational capabilities
  - in context of LSST drilling fields call, and also other facilities
- After this meeting (longer term):
  - sub-groups, centered on various science goals, continue discussions in context of all the observations/ facilities needed

High-level observational needs

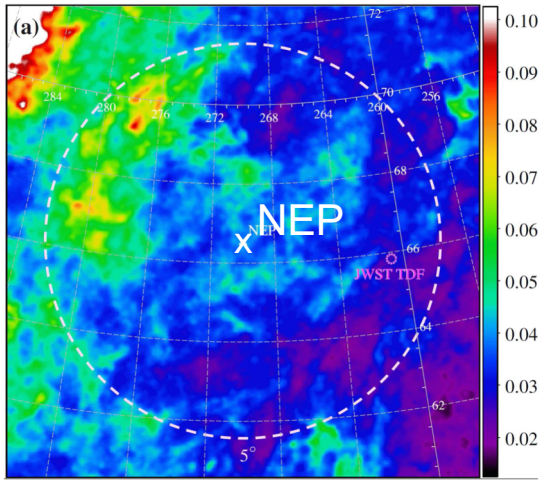
- Mapping the science drivers to desired observations – need to quantify depth, bandpasses, resolution, cadence:
  - imaging
  - spectroscopic
  - temporal
- For all the observations, what do they need in terms of:
  - future facilities
  - current facilities, but future observations necessary
  - current observations already in hand
- Would the science benefit from 'joint processing' (currently envisioned for WFIRST/LSST/Euclid), if so how?

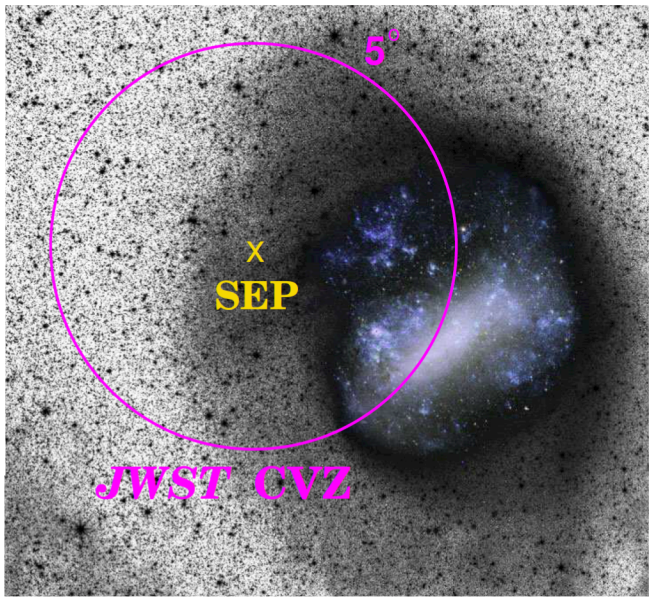
Spatial overlap, cadence

- If multiple facilities are needed for a given science goal, need to quantify overlap considerations in terms of:
  - sky coverage needed
  - temporal overlap needed
  - is CVZ required? (for WFIRST and/ or also Euclid, JWST or other facilities)
- Need to quantify whether currently existing fields can be used:
  - if so, which fields
  - which existing (or future) datasets on these fields would be most important?

Observatory Parameters

- CVZ for WFIRST, JWST, Euclid centered on ecliptic poles:
  - NEP: 18h 00m 00s +66° 33' 38.5520"
  - SEP: 06h 00m 00s −66° 33' 38.5520"
- CVZ radius is governed by sun angle constraints / field of regard, which can be different for each observatory:
  - WFIRST: r = 36°
  - JWST: r = 5°
  - Euclid: r = 5°
- Note however that SEP is near LMC.





Jansen & Windhorst (2018);
Besla et al (2016).

Nominal Depth Capabilities

(see also talks by Bianco, Foley, Capak; and Hounsell et al 2017); sensitivities in all cases are total-depth 5σ point source AB mag:

- WFIRST (PSF ~0.1"):

	Y	J	H	F184
HLS (~2,200 deg^2)	26.7	26.9	26.7	26.2
"SN medium" (~20 deg^2)	27.3*	27.7	27.6	27.0*
"SN deep" (~1-2 deg^2)	28.6*	29.0	28.2	27.7*

*These are not in the SN survey, but are representative, for similar exposure times

- Euclid (PSF ~0.3"):

	Y	J	H
Wide (~15,000 deg^2)	24	24	24
Deep (~40 deg^2)	26	26	26

- LSST (PSF ~0.7") Deep Drilling Fields (also Brandt 2016):
  u=28.5, g=28.7, r=28.9, i=28.4, z=28.0, y=27.0

WFIRST CVZ, LSST and E(B-V)

- Map of E(B-V) < 0.05 in WFIRST CVZ
- green is E(B-V)~0.05, white is E(B-V)~0
- Including LSST coverage would exclude regions > dec +40

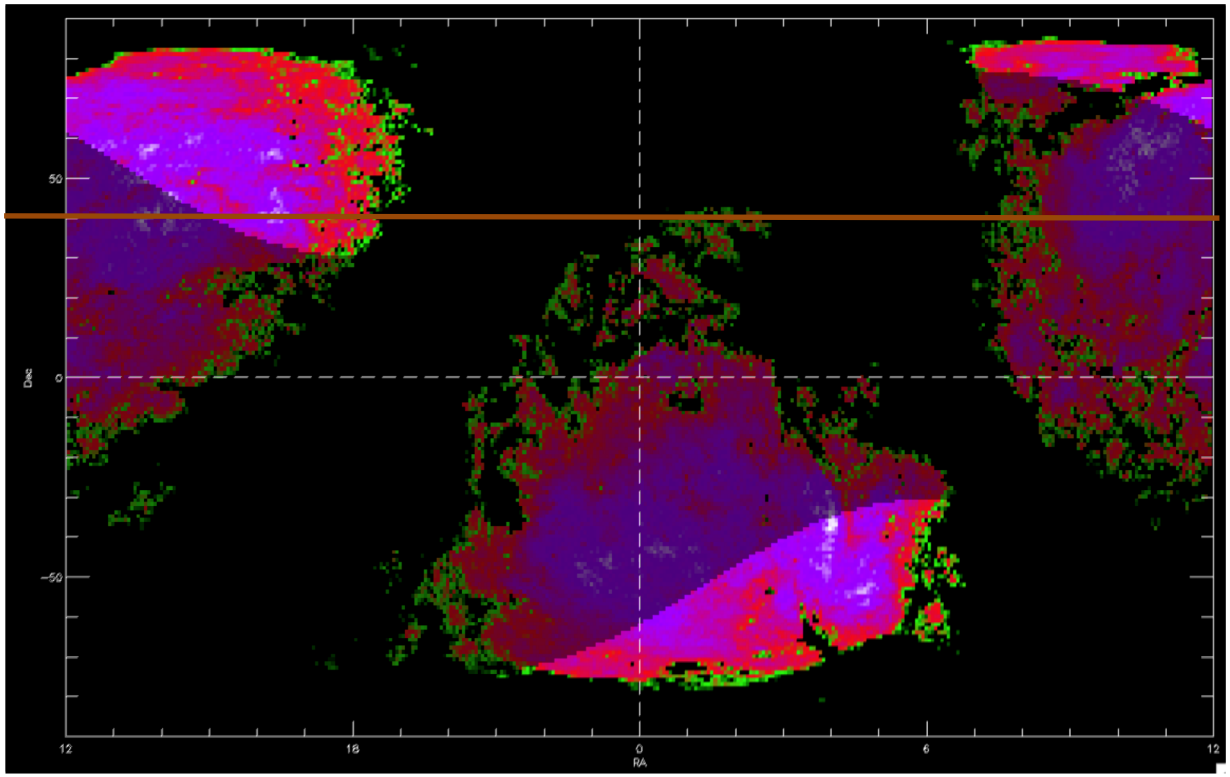


Figure courtesy of Ryan Foley

Sky coverage and current fields

- Blue lines indicate current CVZ limits for WFIRST, centered on ecliptic poles (based on sun angle constraint of 54˚)

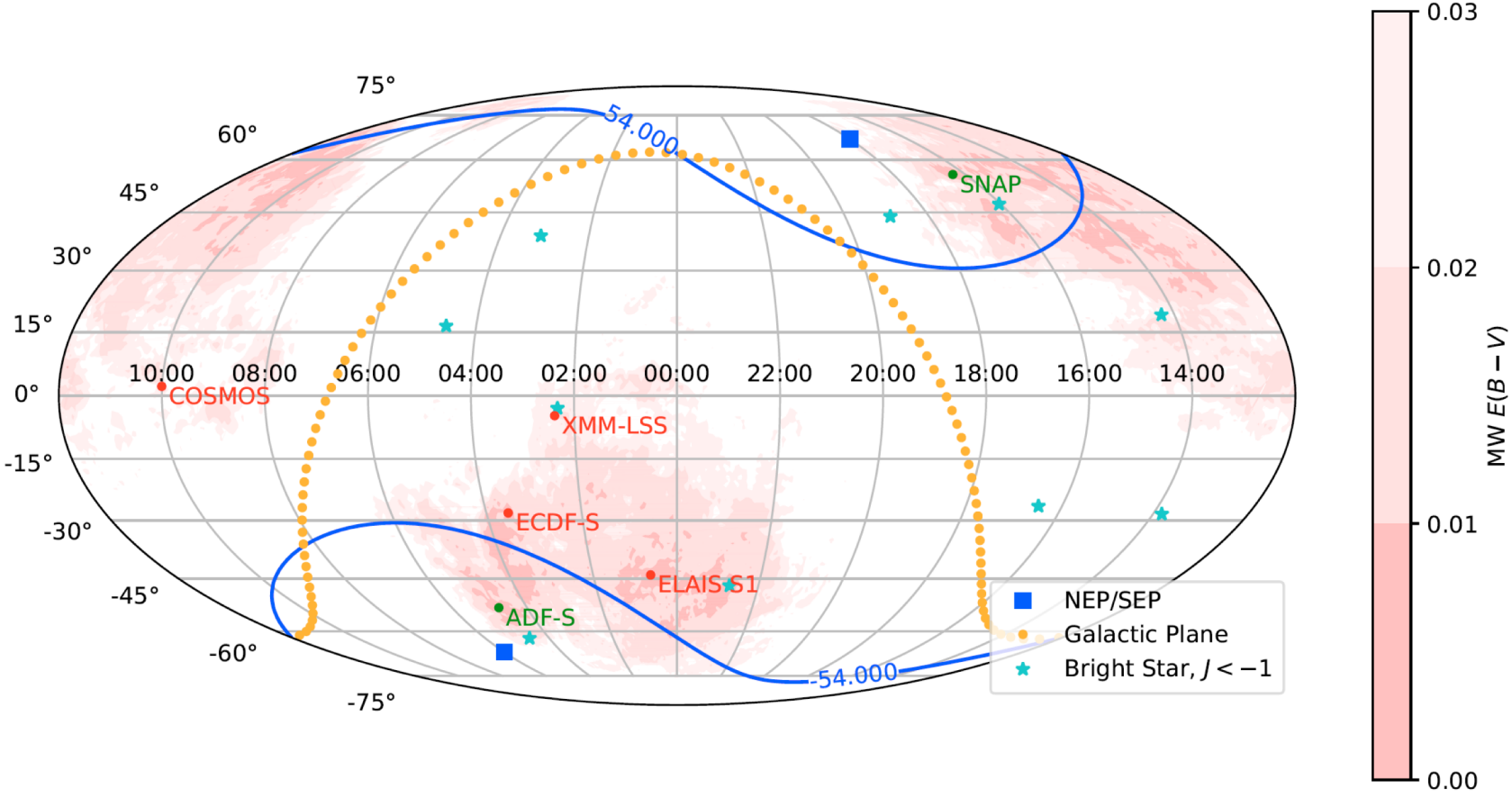


Figure courtesy of David Rubin

List of some current fields

https://www.overleaf.com/10469108xwhqkxtcfycm#/39017211/

Field	R.A.	Dec.	Ecl. Lat.	Area	E(B-V)	Rel. Zodi[a]	Days/Year
WFIRST CVZ fields ($< 36°$)							
IRAC Dark Field	17:40	+69:00	+87	0.2	0.043	1.0	365
Extended Groth Strip	14:17	+52:30	+60	0.2	0.009	1.2	365
GOODS-N	12:36	+62:13	+57	0.25	0.012	1.2	365
Deep2A	16:52	+34:55	+57	1	0.018	1.2	365
Elias N-2	16:46	+41:01	+63	5	0.014	1.1	365
Elias N-1	16:11	+55:00	+73	9	0.008	1.0	365
Akari Deep Field South	04:44	−52:20	−73	12	0.008	1.0	365
NEP-JWST-GTO-TDS	17:22	+65:49	+86	0.2	0.042	1.0	365
NEP-Spitzer	18:00	+66:33	+90	10	0.046	1.0	365
SEP-Spitzer	06:00	−66:33	−90	10	0.062	1.0	365
Non-CVZ fields							
CDFS	03:32	−27:48	−45	0.3	0.008	1.4	229
Deep2B	23:30	+00:00	+3	1	0.044	19	146
SSA22	22:17	+00:24	+10	4	0.056	5.6	149
COSMOS	10:00	+02:12	−9	2	0.018	6.0	148
VVDS14h	14:00	+05:00	+16	4	0.026	3.6	153
Elias S-1	00:35	−43:40	−43	7	0.008	1.5	215
Bootes	14:32	+34:16	+46	9	0.016	1.4	236
Lockman Hole	10:45	+58:00	+45	11	0.011	1.4	229
XMM-LSS	02:31	−04:30	−18	11	0.024	3.2	155
SPT Deep	23:30	−55:00	+46	100	0.010	1.4	236
HERA	07:00	−30:43		1200			

[a]Zodi values provided by David Rubin based on his calculations, corresponding to plane parallel zodi, relative to a normalized value of 1.0 at the ecliptic poles.