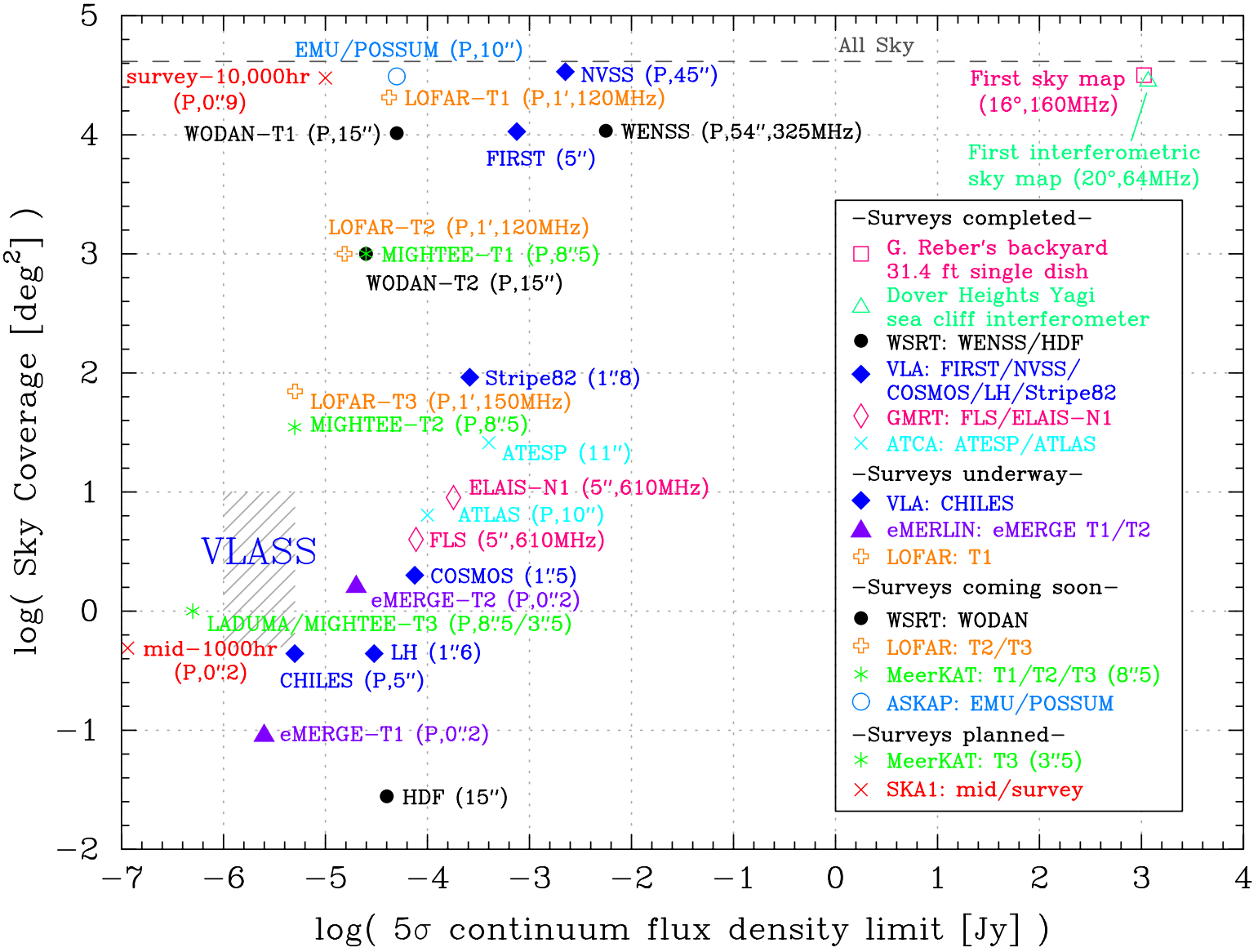
Go deep, not wide

Christopher Hales (Jansky Fellow, NRAO Socorro)

- VLA's strengths: sensitivity, angular resolution
- Deep survey (rms ~ 0.2uJy) over <10 square degrees will have legacy value well into the SKA era
- L-band A-array is most appropriate (+commensal P-band)
- A-array is least disruptive to PI-led science
- Choice of field: ideally an existing multiwavelength field, e.g. COSMOS, LSST deep drilling, DES deep supernova
- Unique science: galaxy evolution, HI, dark energy and dark matter, cosmic magnetism, transient and variable sources, radio stars
- Unique: produce gold-standard VLASS catalog to inform automated source extraction in all-sky SKA1-survey (rms 2uJy)


70 years of mapping the radio sky:
Selected surveys scaled to 1.4 GHz using S∝ν^−0.8
log(Sky Coverage [deg^2])
log(5σ continuum flux density limit [Jy])
All Sky
EMU/POSSUM (P,10″)
survey−10,000hr (P,0.″9)
NVSS (P,45″)
LOFAR−T1 (P,1′,120MHz)
First sky map (16°,160MHz)
First interferometric sky map (20°,64MHz)
WODAN−T1 (P,15″)
WENSS (P,54″,325MHz)
FIRST (5″)
LOFAR−T2 (P,1′,120MHz)
MIGHTEE−T1 (P,8.″5)
WODAN−T2 (P,15″)
Stripe82 (1.″8)
LOFAR−T3 (P,1′,150MHz)
MIGHTEE−T2 (P,8.″5)
ATESP (11″)
ELAIS−N1 (5″,610MHz)
ATLAS (P,10″)
FLS (5″,610MHz)
VLASS
COSMOS (1.″5)
eMERGE−T2 (P,0.″2)
LADUMA/MIGHTEE−T3 (P,8.″5/3.″5)
mid−1000hr (P,0.″2)
LH (1.″6)
CHILES (P,5″)
eMERGE−T1 (P,0.″2)
HDF (15″)
−Surveys completed−
G. Reber's backyard 31.4 ft single dish
Dover Heights Yagi sea cliff interferometer
WSRT: WENSS/HDF
VLA: FIRST/NVSS/ COSMOS/LH/Stripe82
GMRT: FLS/ELAIS−N1
ATCA: ATESP/ATLAS
−Surveys underway−
VLA: CHILES
eMERLIN: eMERGE T1/T2
LOFAR: T1
−Surveys coming soon−
WSRT: WODAN
LOFAR: T2/T3
MeerKAT: T1/T2/T3 (8.″5)
ASKAP: EMU/POSSUM
−Surveys planned−
MeerKAT: T3 (3.″5)
SKA1: mid/survey