The Allen Telescope Array

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ASTRON

Collaboration

UC Berkeley Radio Lab

Bower, Croft, Welch, Backer, Heiles, Blitz, Urry, Engargiola, Fleming, Kraybill, Lugten, Wright

SETI Institute

Tarter, Davis, Drake, Dreher, Ackerman, Deboer, Harp

CASPER/BWRC

Werthimer, Cheng, Nagpal, Wawrzynek, Parsons

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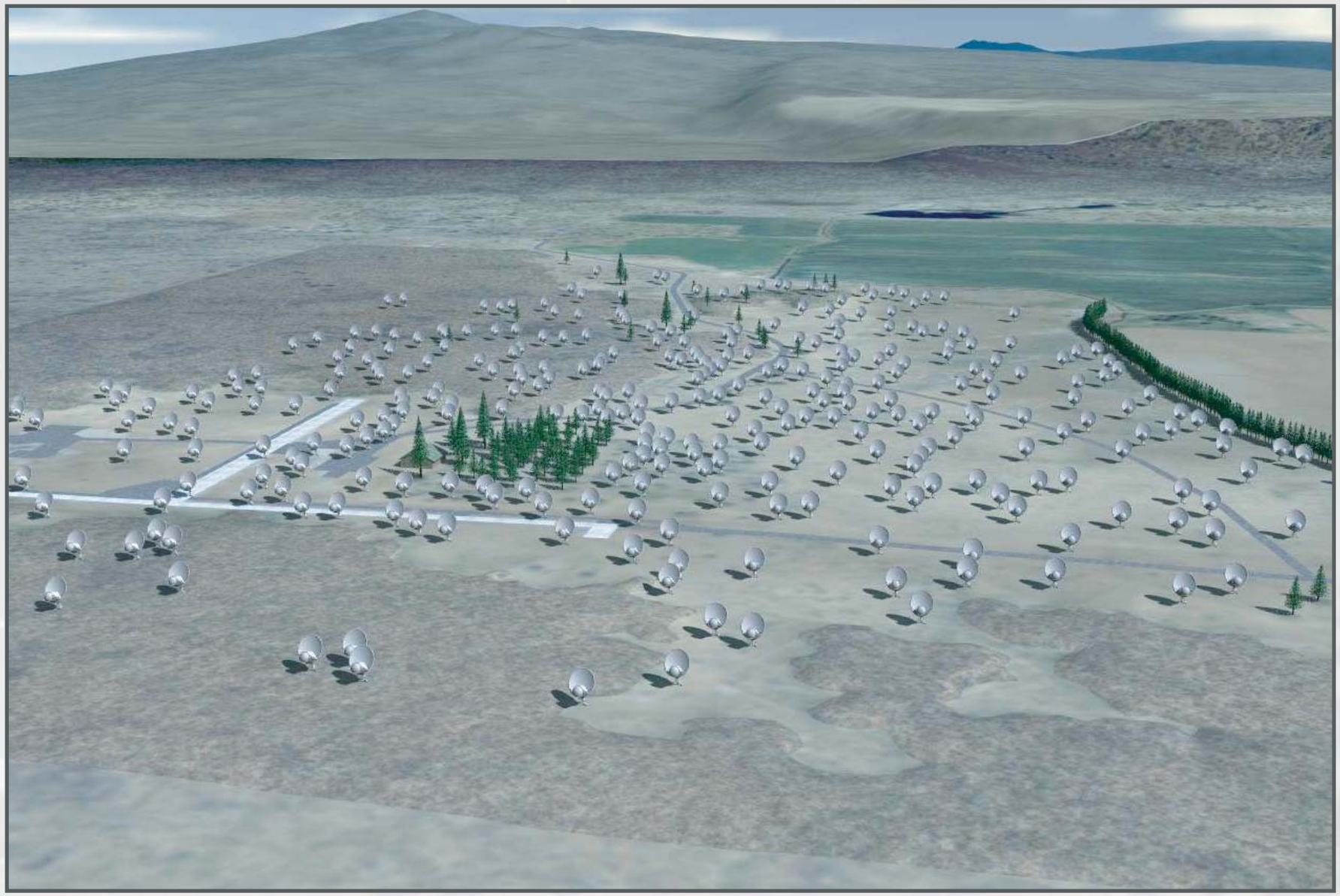
Telescope concept

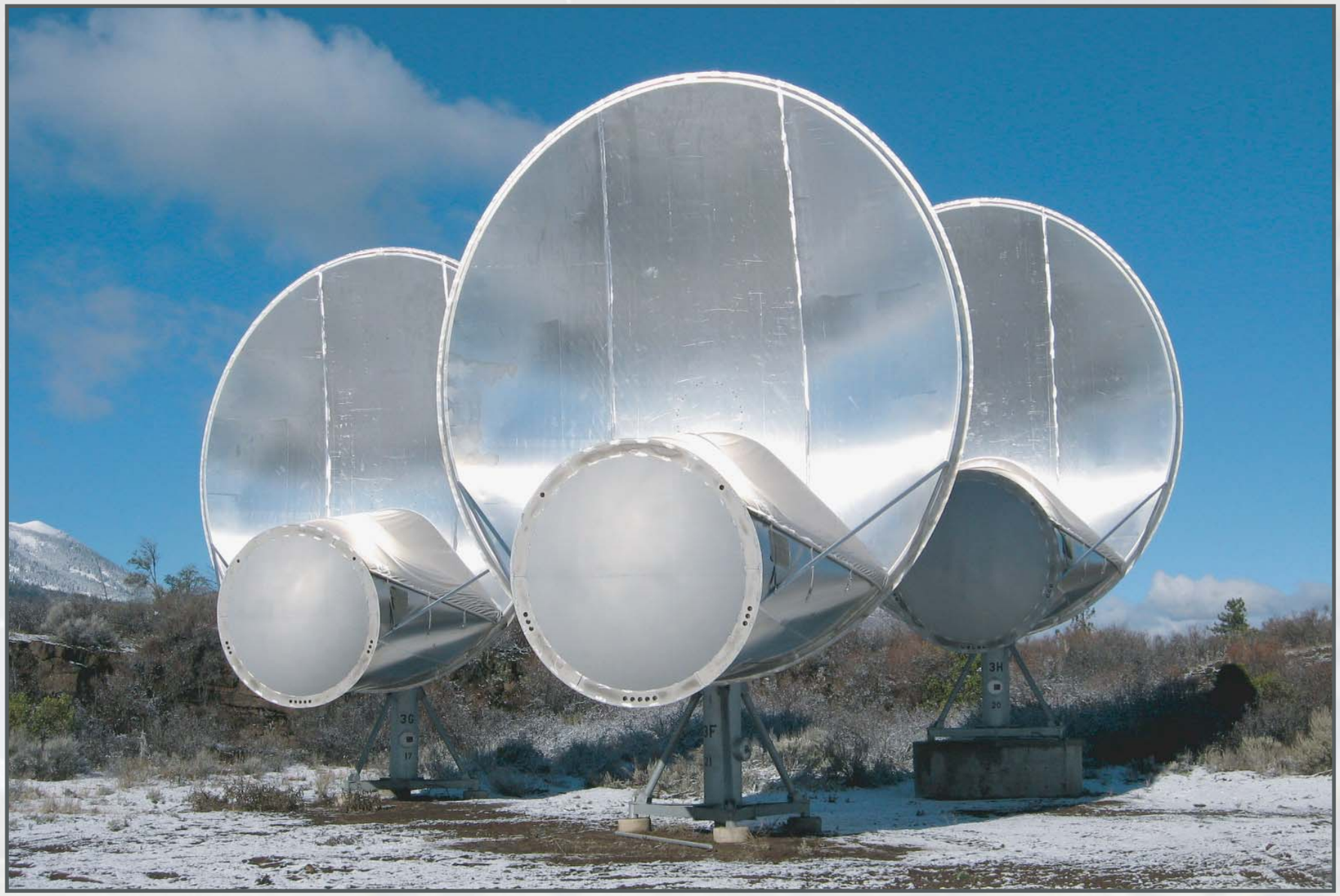
A survey telescope — exploit decreasing back-end electronics and satellite-dish costs.

cf. Seti 2020 (1997)



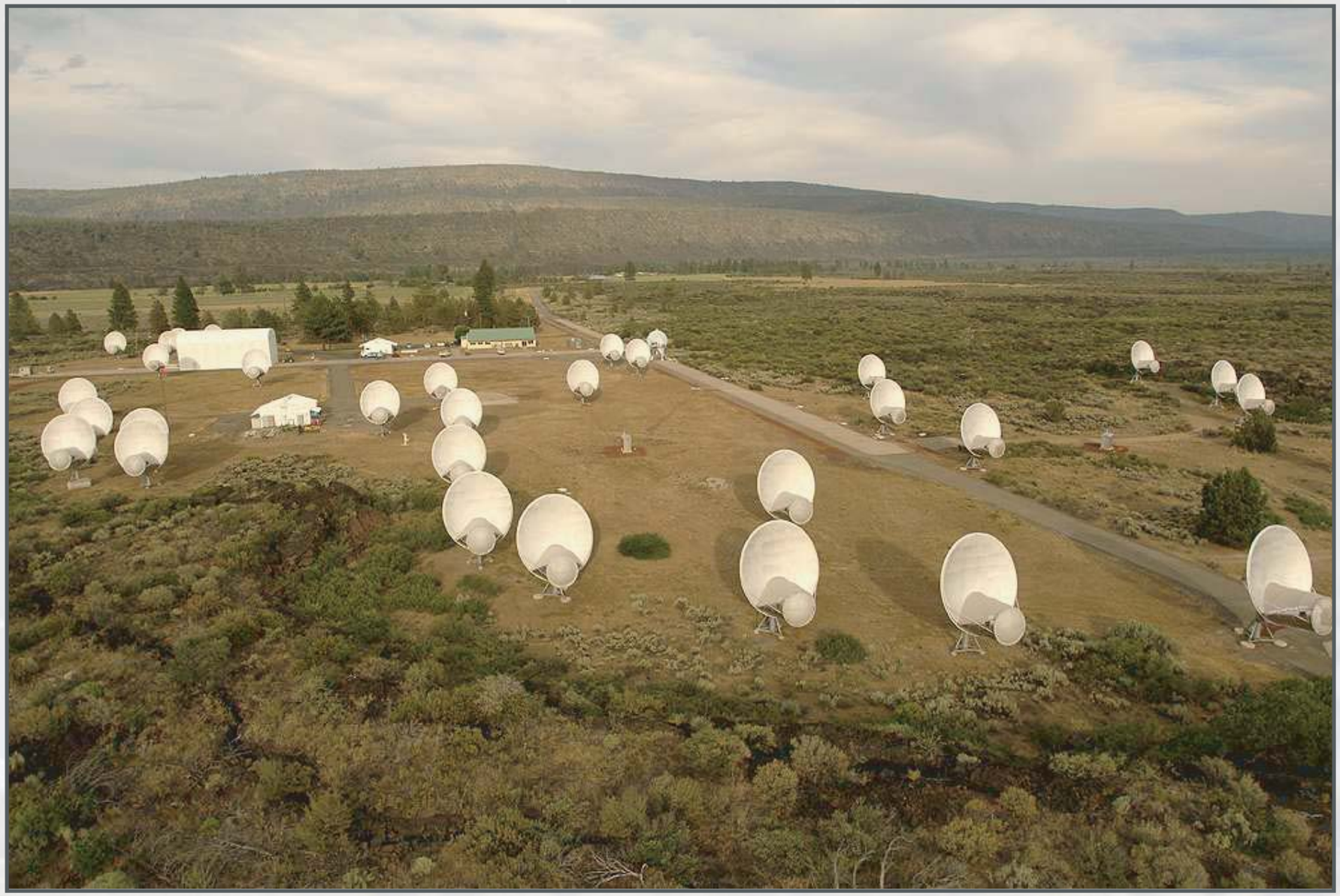
Telescope design — Dish

Dishes are 6.1m primary/2.4m secondary offset Gregorian, for a 5 square degree FoV @ 1.4GHz



Telescope design — Layout

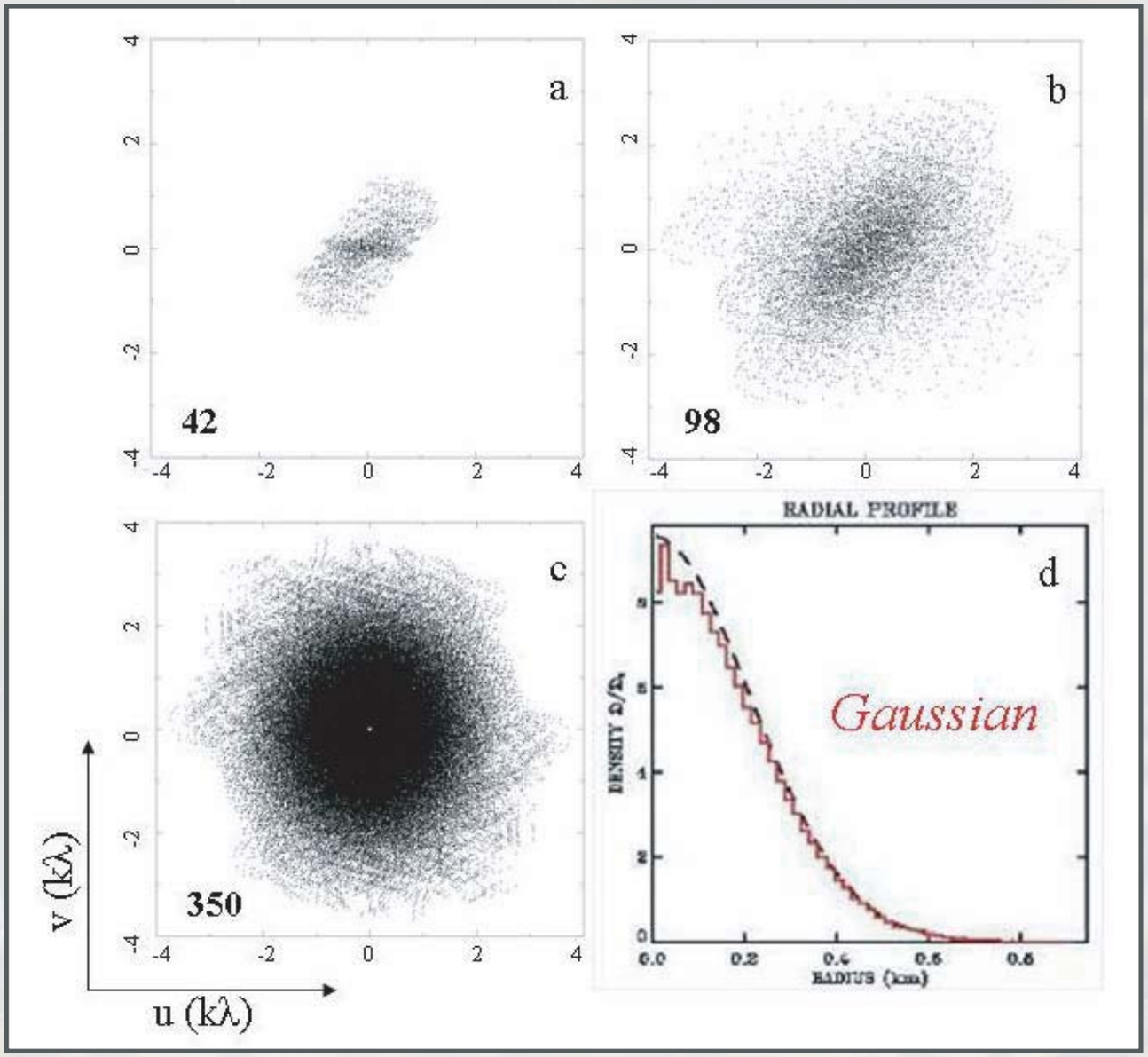
Currently 42 dishes (ATA-42).
Guassian baseline distribution



Telescope design — Layout

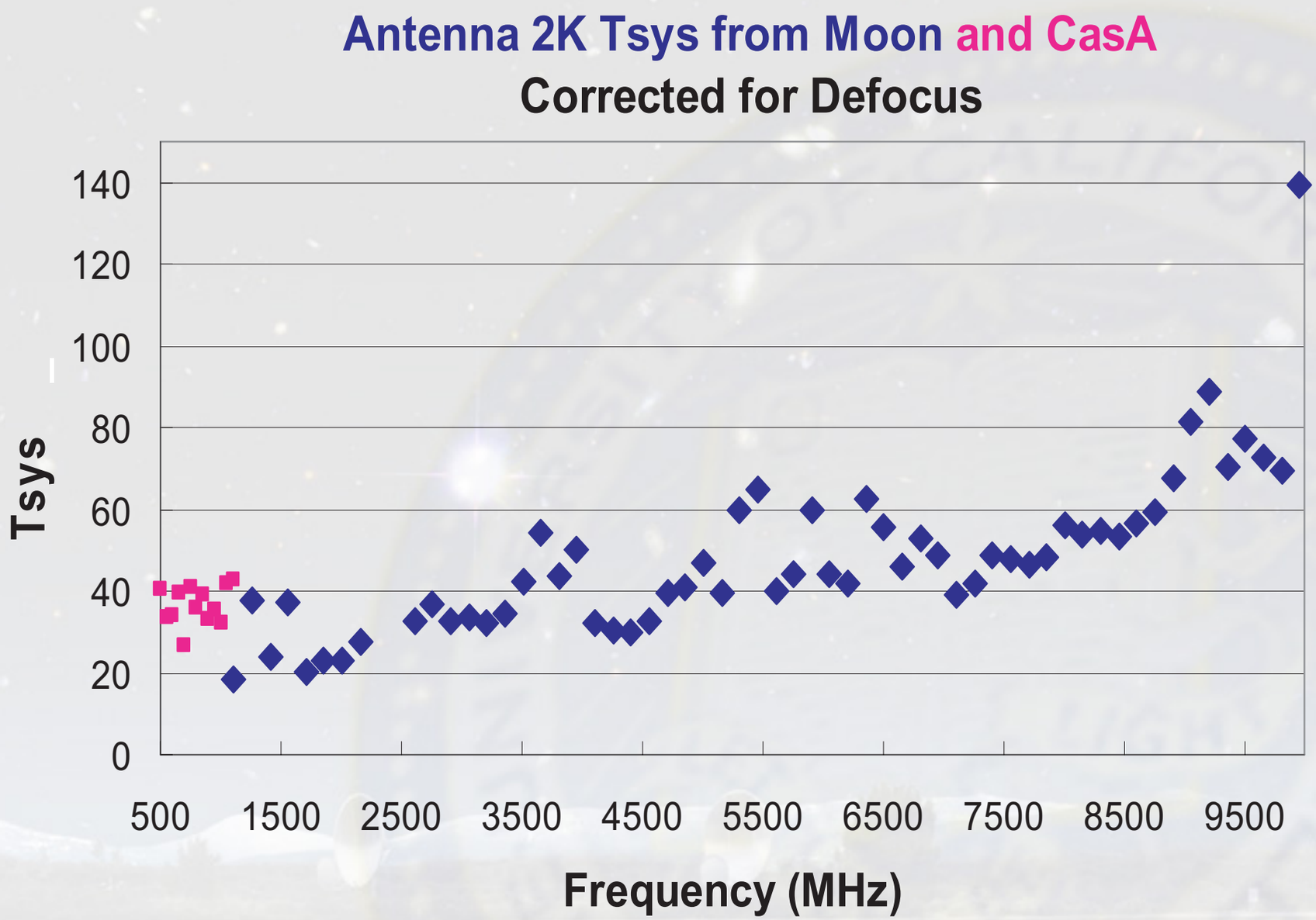
Currently 42 dishes (ATA-42).
Good snapshot uv coverage

(Welch et al. 2009)



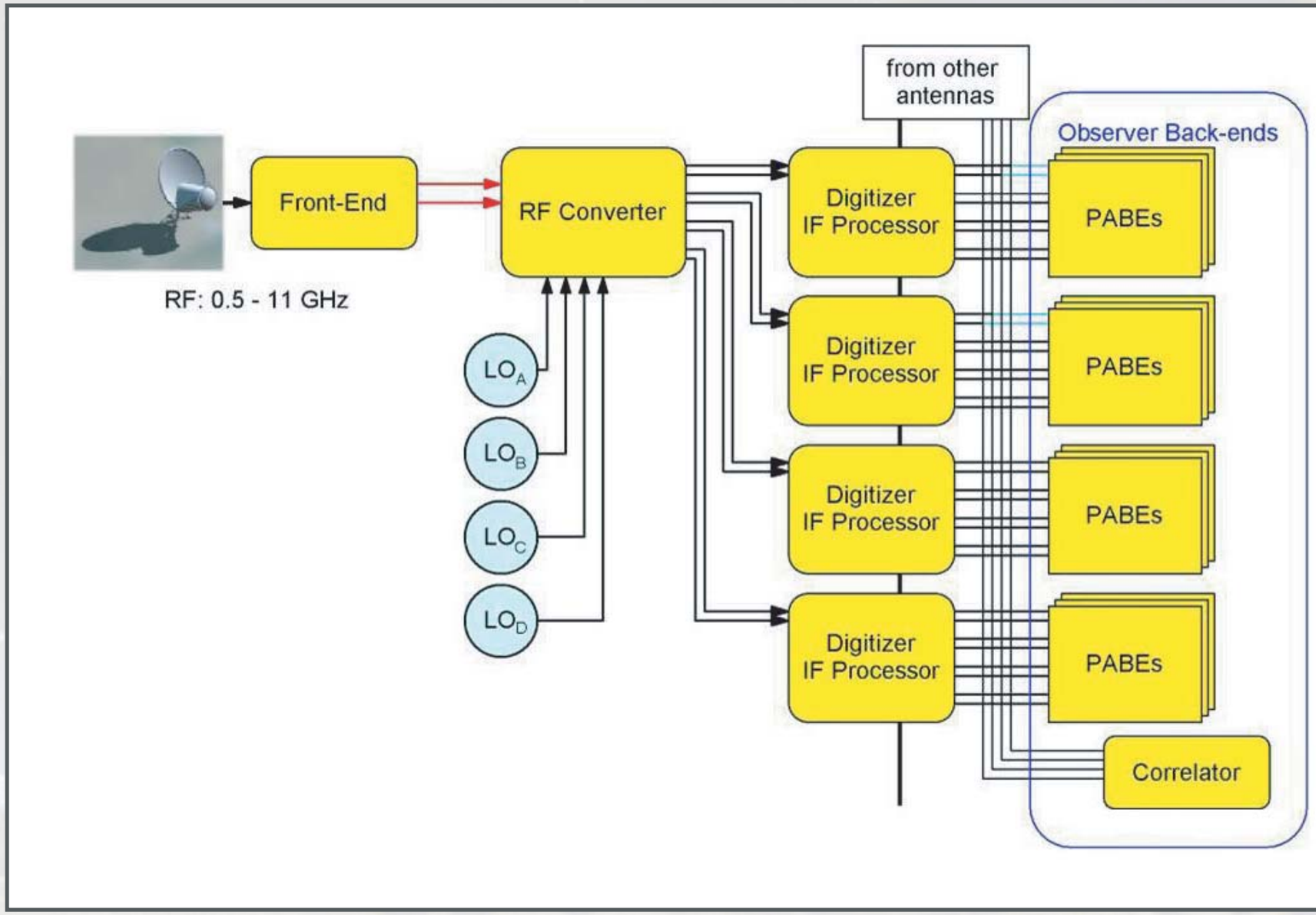
Telescope design — Feed

Log-periodic feed, for 4 octaves 0.5-10 GHz



Telescope design — IFs

4 Tunable IFs anywhere in the band



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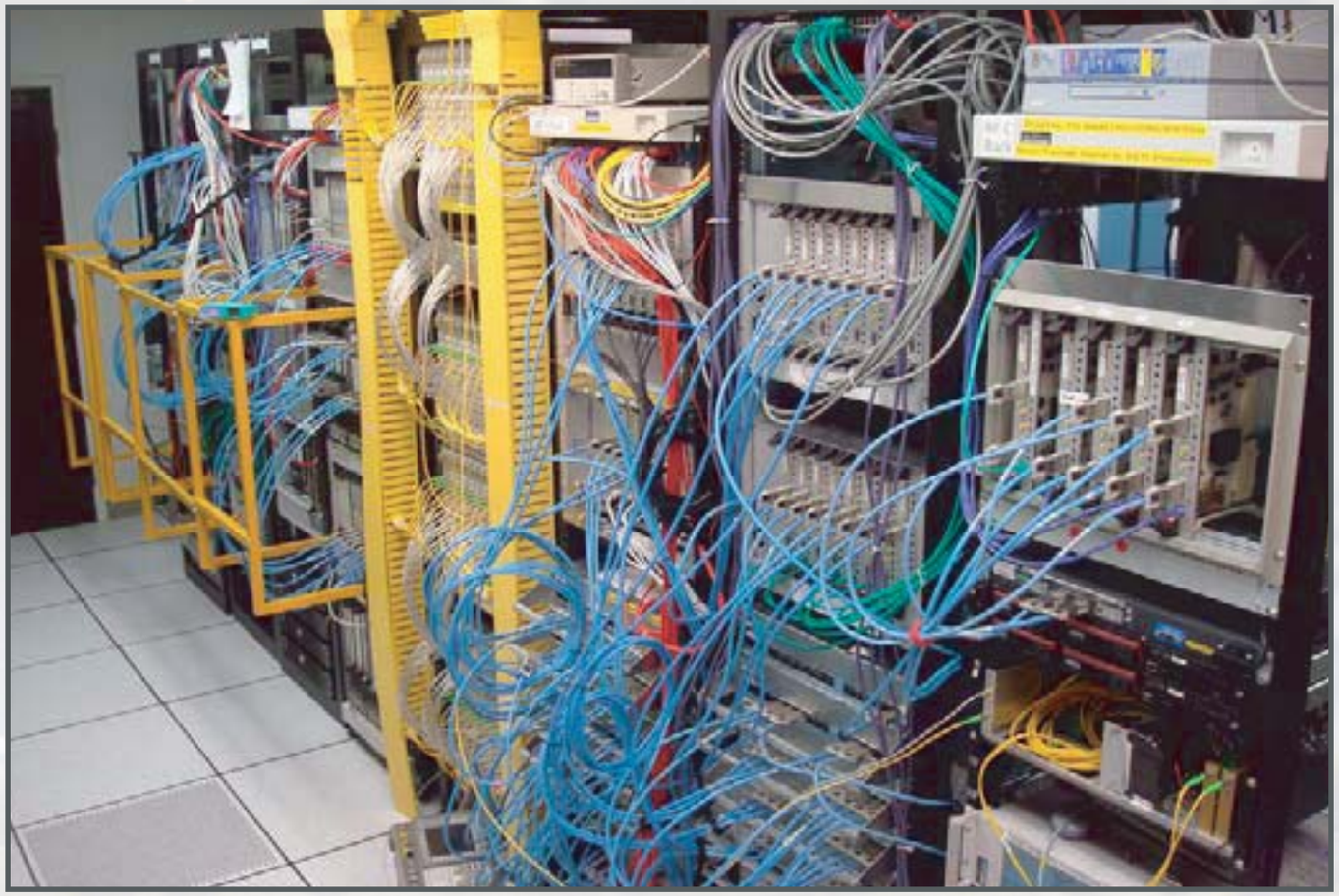
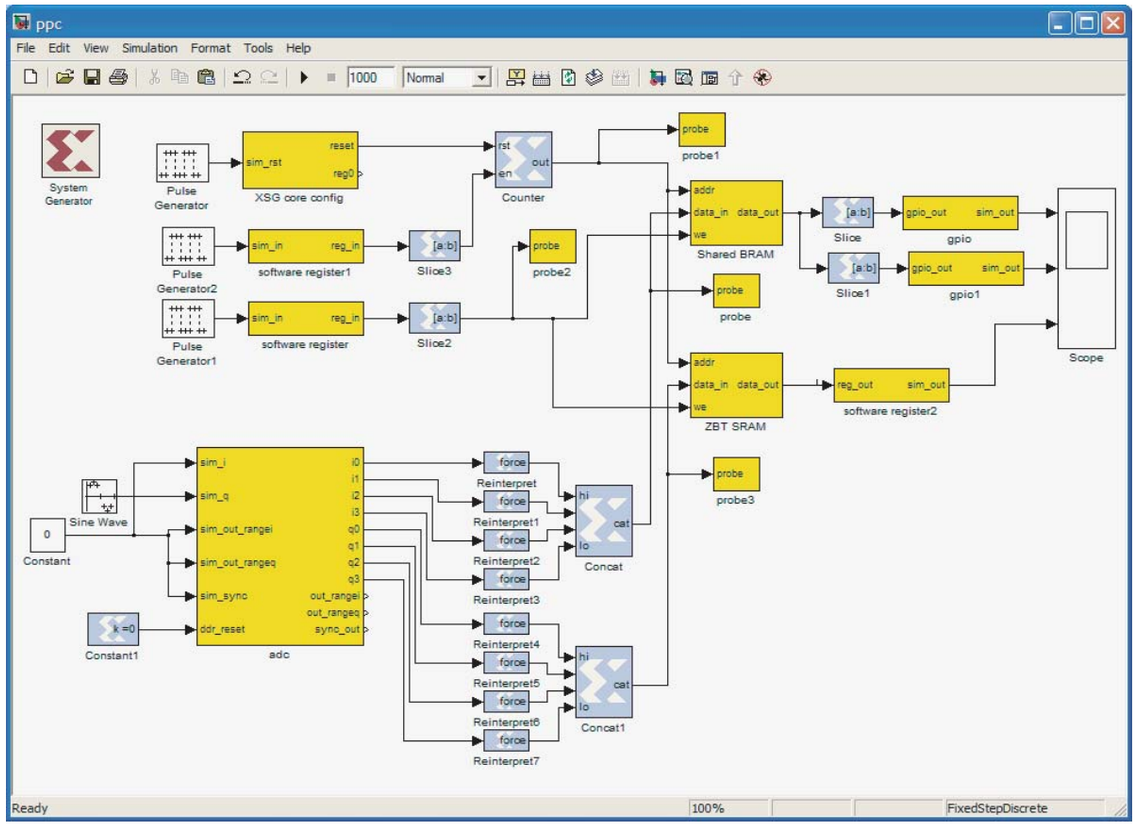
Correlator

2 tunings x 32 ants x 4 Stokes x 1024 channels
Additional pair coming soon to produce 2 x 42
Narrowband mode developed and tested



Beamformer

2 (soon: 3) tunings, 2 polarisations
CASPER: Low cost, fast, modular



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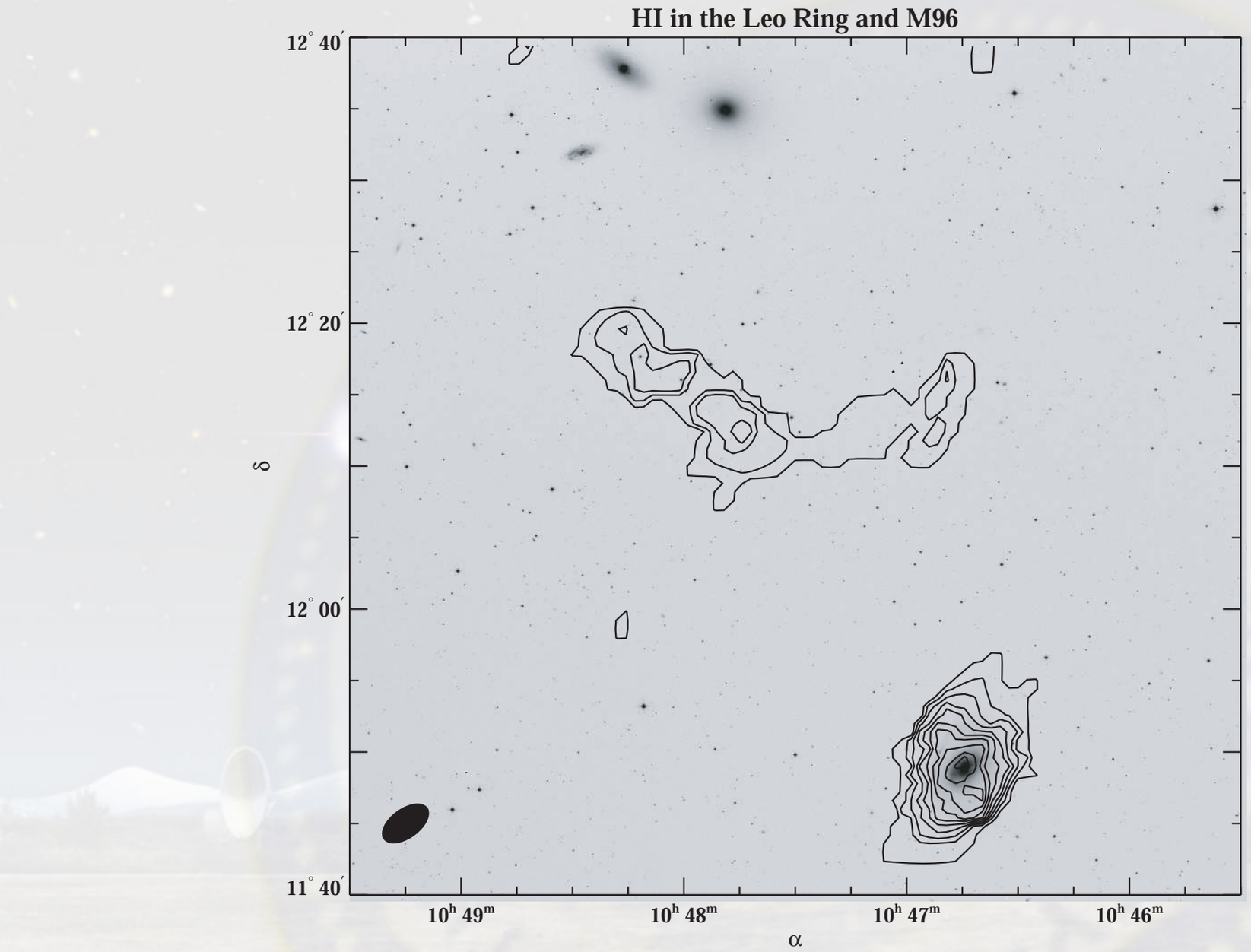
HI

Wide-field, resolution, fast imaging capabilities:
surveys of extragalactic HI in the local universe.



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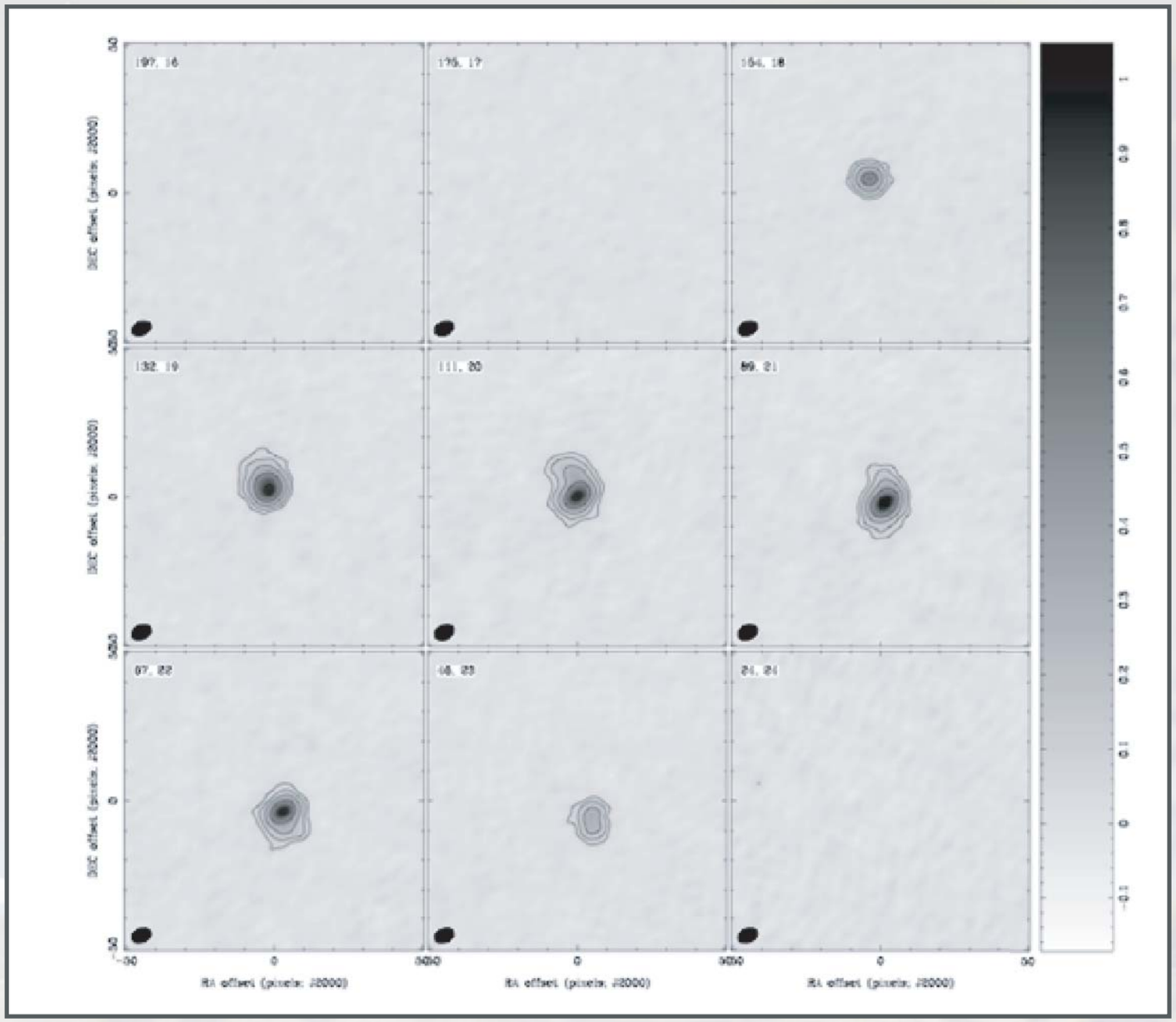
HI

Imaging in nearby galaxies
NGC 236

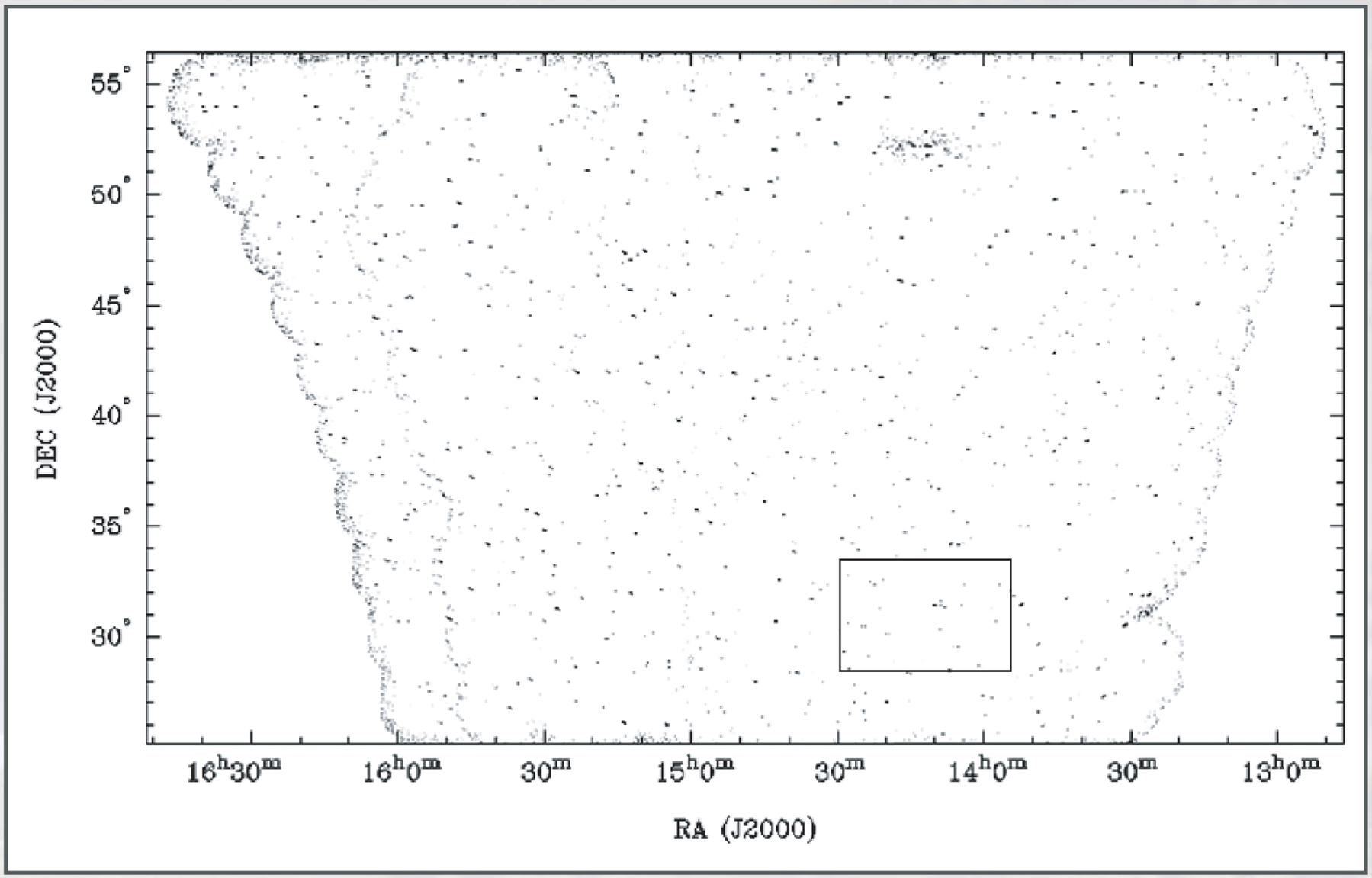
(Bauermeister et al. 2009)



ATATS

ATA 20-cm survey, 800 square degrees
350 pointings in 10 hours, >10 epochs

(Croft et al. 2009)



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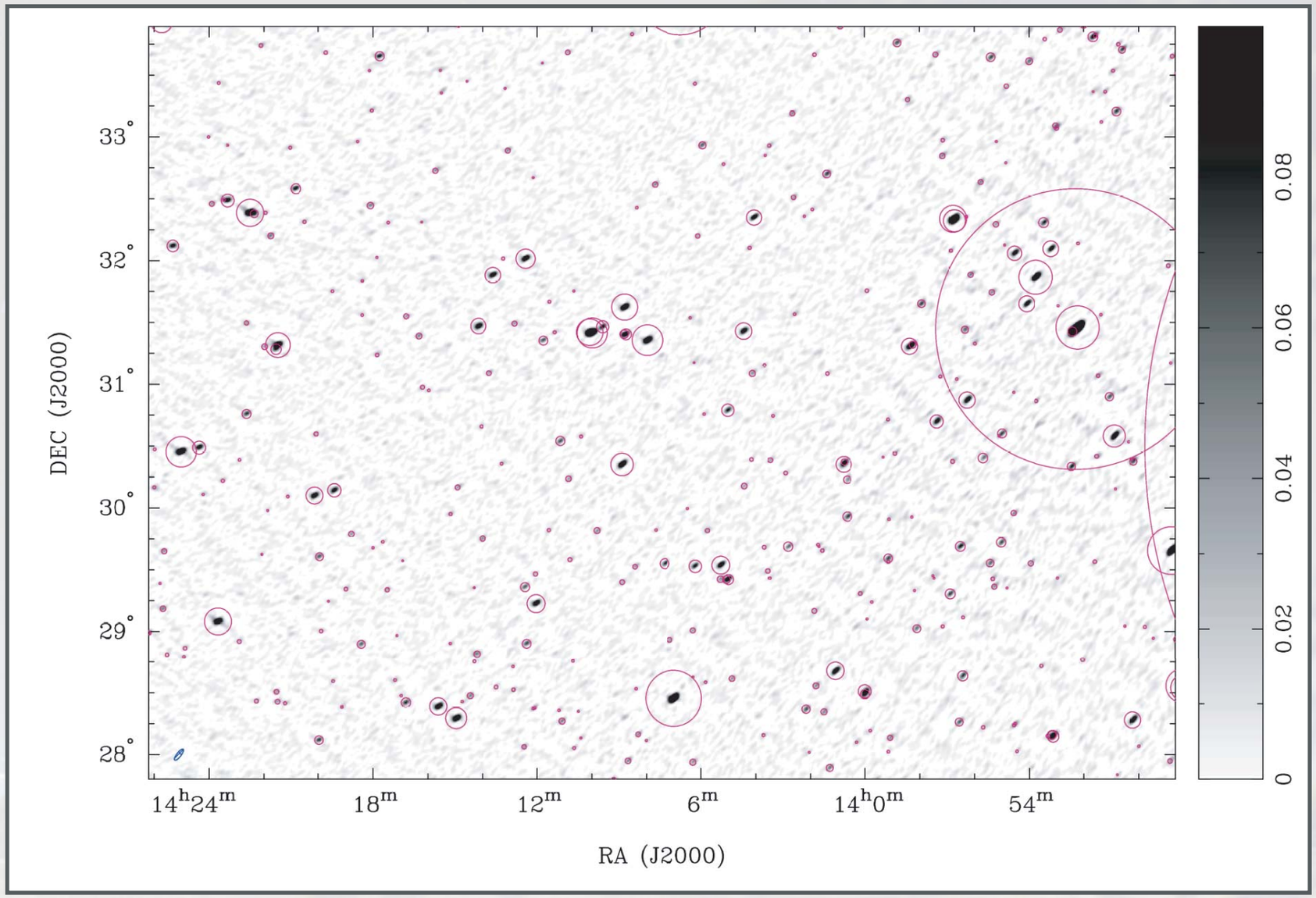

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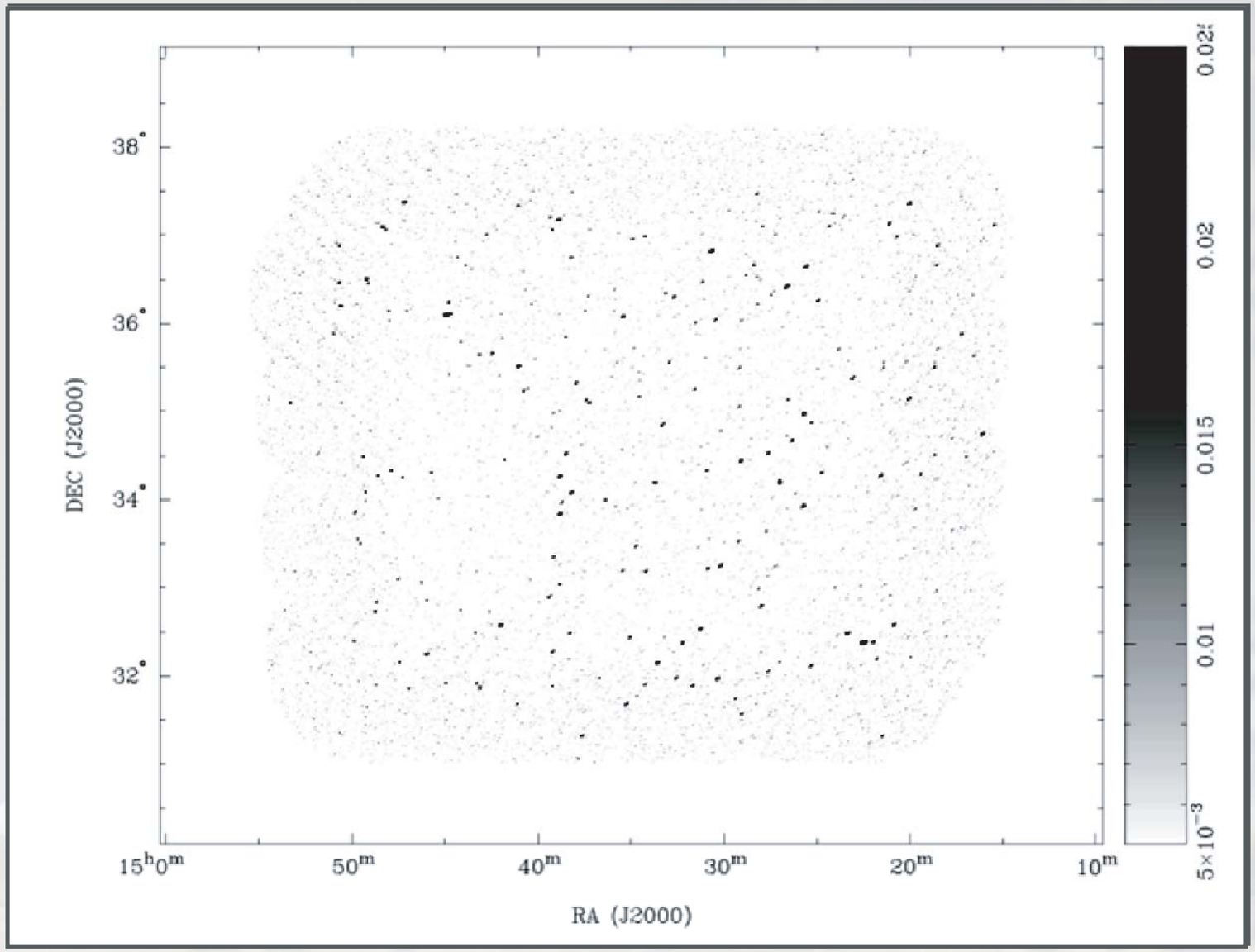
Surveys

3 and 5GHz (PiGSS, FiGSS) surveys started
1000 square degrees, 3 times

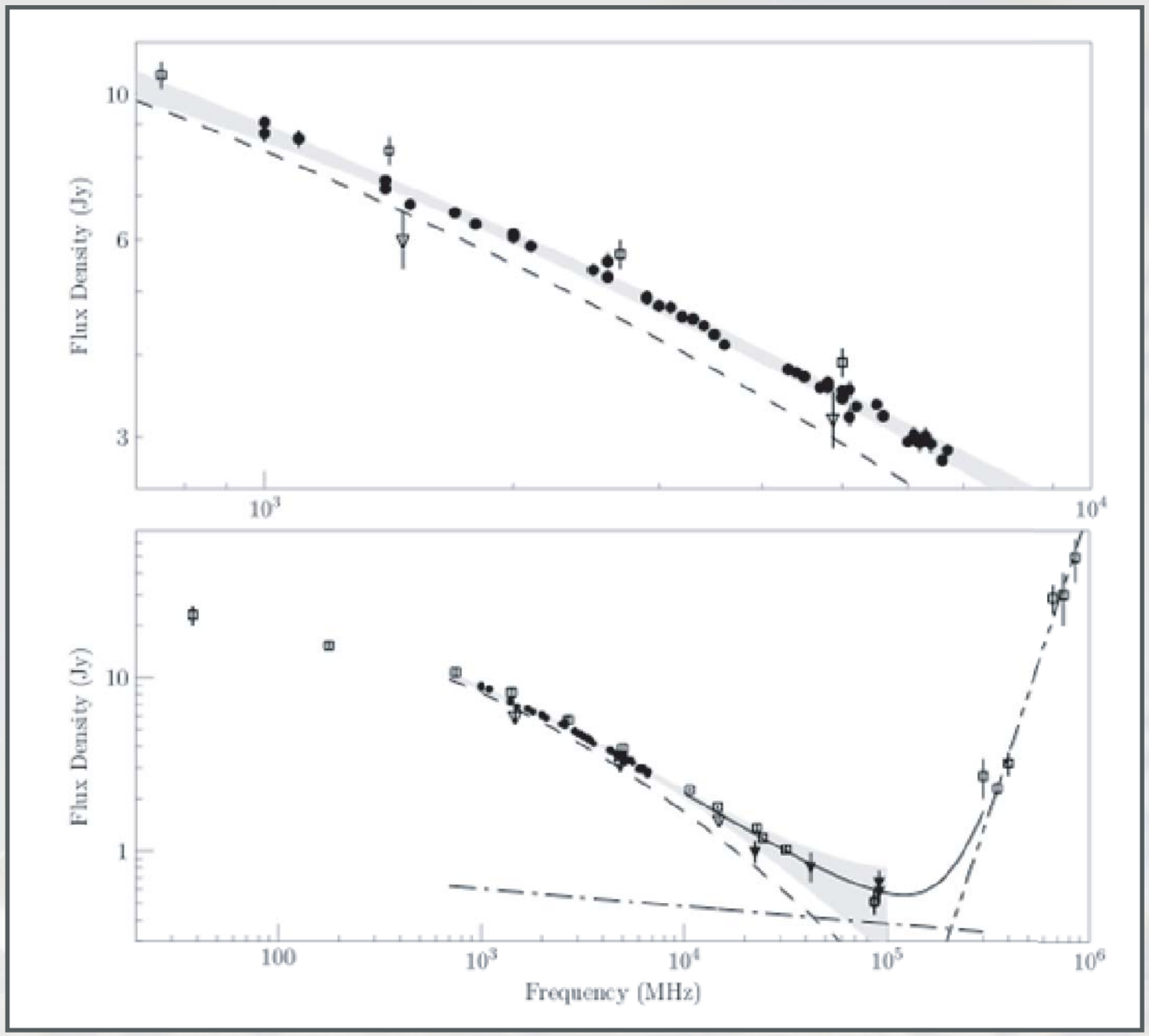
(Bower et al. 2009)



Spectra

Continuous spectra of star-forming galaxies:
M82

(Williams & Bower 2009)



Conclusions

Wide-field, resolution & fast imaging capabilities:
well suited for
surveys of extragalactic HI in the local universe.