E-Configuration

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What, and Why?

- A super-dense, compact configuration with maximum spacing ~ 250 meters.
  - Resolution ~2.0’ at 20cm, 4.5” at 7mm.
- Halfway between GBT and D-configuration resolution.
- Three times larger beam => 10 times higher surface brightness sensitivity than ‘D’-config.
- Provides faster, more accurate imaging than a tapered D-configuration.

A (Small) Part of Phase II

- Originally was a component of Phase I EVLA.
- Dropped due to budget cap and development/design issues.
- Retained within Phase II as a (minor) component of the expansion.
- Concept has generally been well supported as a potential stand-alone proposal.

Performance

- The following table shows 1-hour 1-σ performance.

Band	Res'n	CPSS	Confusion	CBTS	LPSS	LBTS
	arcsec	μJy	μJy/beam	μK	mJy	mK
L	120	6.2	610	135	1.8	37
S	60	3.0	93	64	1.1	23
C	30	2.3	14	50	.85	18
X	19	2.8	4.0	60	.78	16
Ku	13	2.5	1.4	57	.71	15
K	9	3.2	.50	67	.85	18
Ka	6	3.5	.17	74	.78	16
Q	4.5	6.9	.082	140	1.1	24

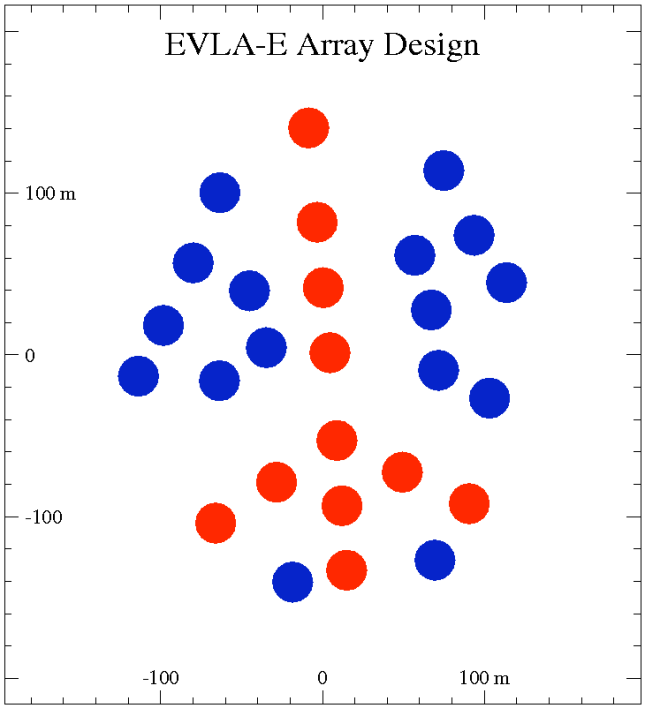
CPSS: Continuum Point Source Sensitivity
CBTS: Continuum Brightness Temperature Sensitivity
LPSS: Line Point Source Sensitivity (1km/sec).
LBTS: Line Brightness Temperature Sensitivity

Science

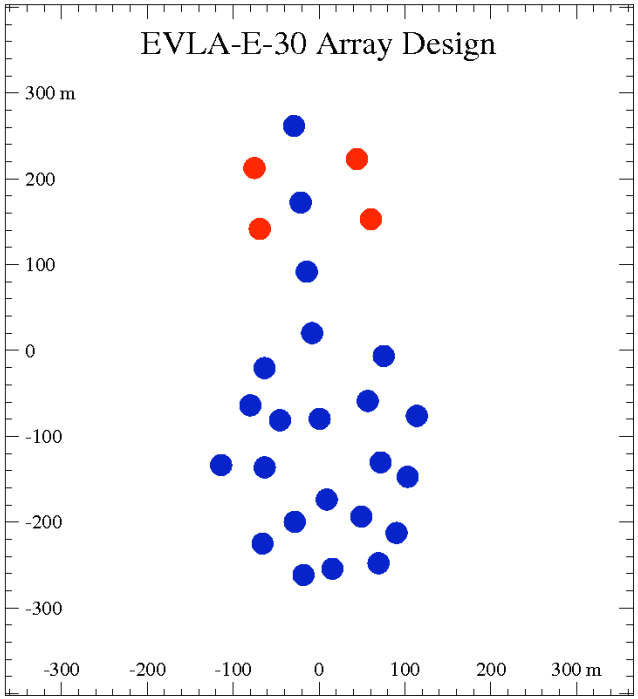
- Large-Angle Low-Brightness Surveyor
- Commonly used in mosaic mode, often in conjunction with GBT, or other single dish.
- Quoted applications (from Phase II proposal):
  - Imaging S-Z in galaxy clusters.
  - HI and non-thermal imaging of nearby galaxies, Galactic chimneys, and shells.
  - Mapping of Zeeman splitting of HI, molecular, and RR lines.
  - Imaging comet emission, SNR, ISM, thermal emission lines
  - Imaging of diffuse synchrotron emission from particle acceleration sites throughout the universe.

Some Design Details

- Game is to get the antennas as close together as possible, but also to prevent excessive shadowing.
- Two configurations proposed.



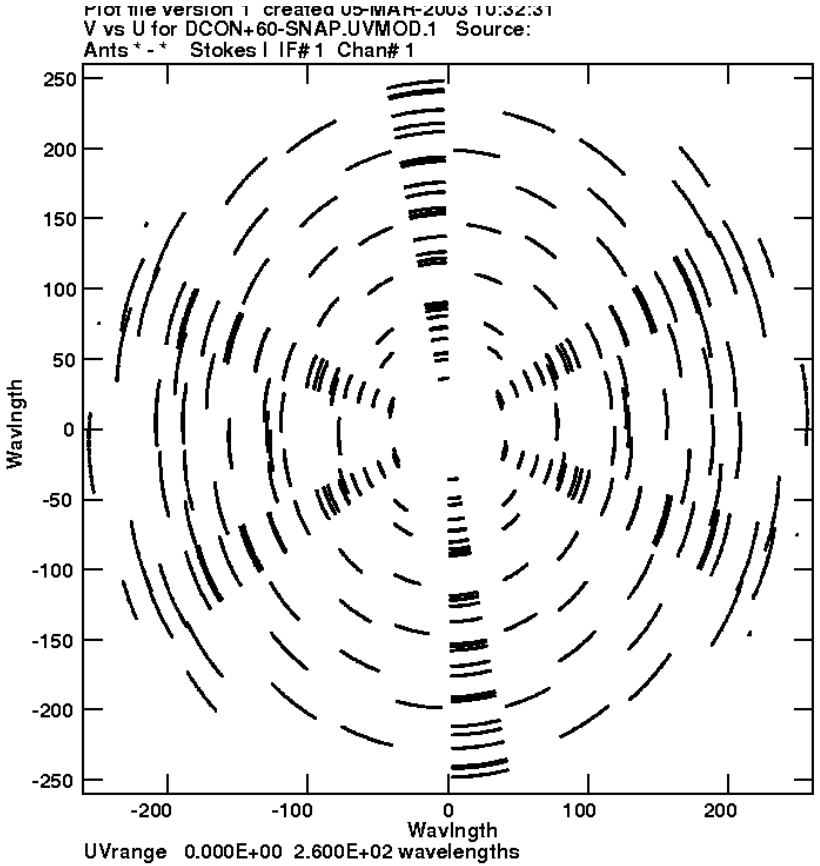
Red: Existing Stations
Blue: New Stations

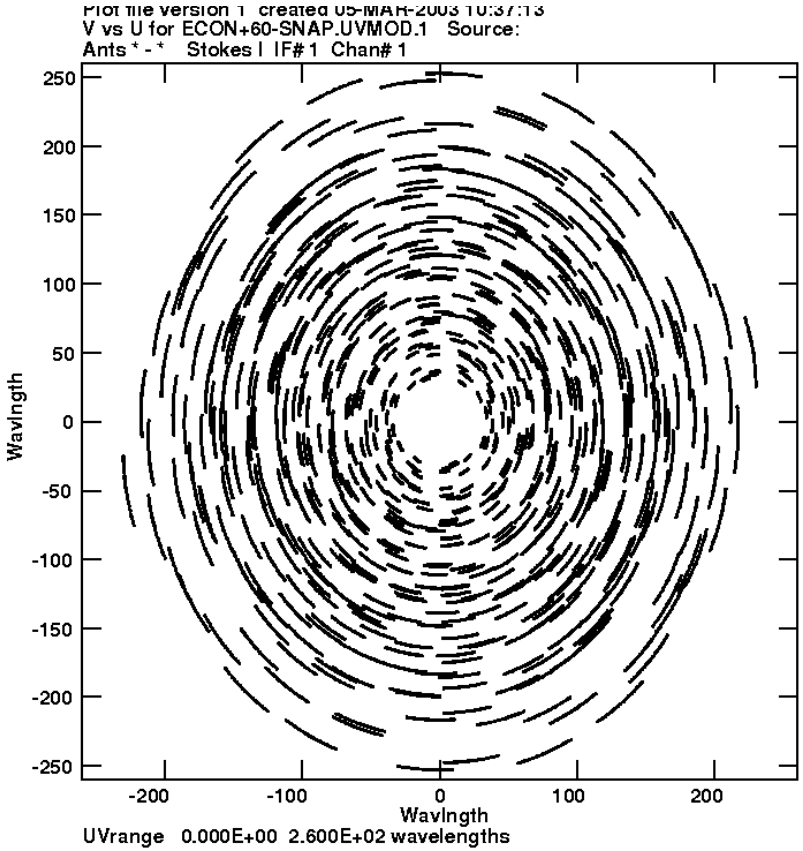


Blue: Existing plus E-config.
Red: Additional for E-30

UV-coverage

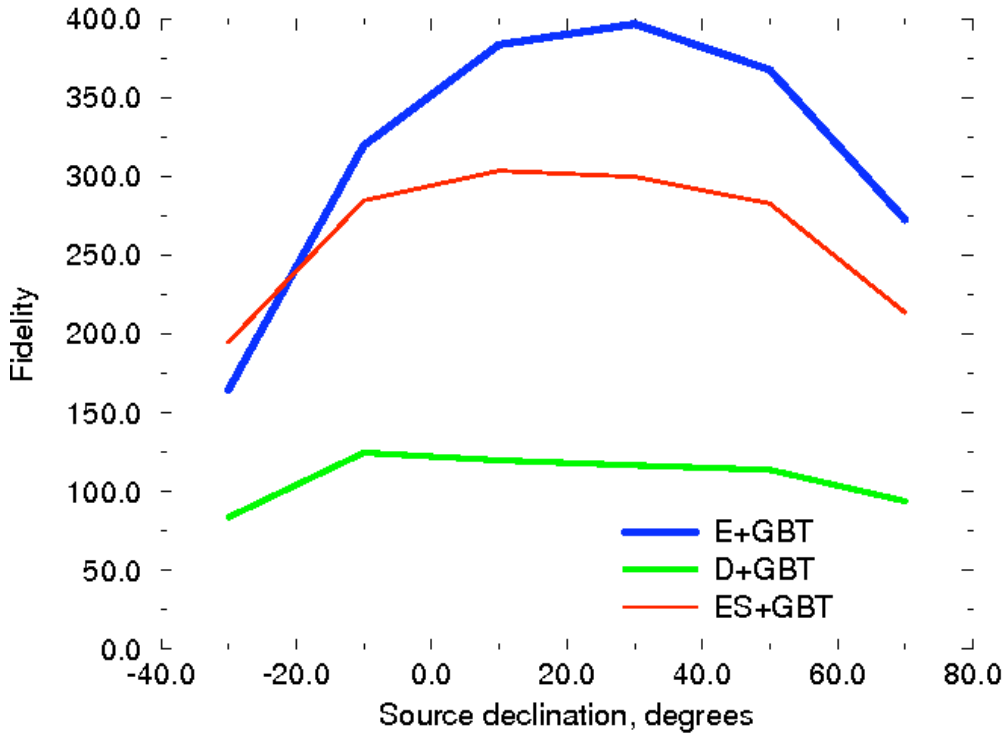
- Comparison of D with E : 1 hour at $\delta = 60$.
- More uniform coverage, more different spacings mean faster, better imaging.





Fidelity

- A much better imager than D-configuration, especially when combined with GBT data.



Cost, and Schedule

- Guy Sanzione has updated costs (2007) (in $K)

	Basic E	E-30 addit.
Engineering & Consulting	310	82
Track	1165	278
Earthwork	287	52
Foundation	2886	722
Power	197	62
Fiber	105	34
Taxes & Contingency	605	130
Management, Wages, Benefits	320	100
Total	5880	1376

Some Closing Points

- Zero Technical Risk.
  - This is a 'can't fail' project. It's all about civil engineering.
  - Can be done in parallel with EVLA construction.
- The surveying and imaging capabilities are provided for all bands at once!
  - The major cost – feeds and receivers – are already there.
- Interferometry is the best way to get high-fidelity imaging.
  - Can't compete with GBT's brightness sensitivity, but can do far better in dynamic range, and in overall cost. There is broad support for this in the community.
- Many possible partners – some (e.g., Karl Menten) with money.
- May be a window of opportunity available now
  - Part of an EVLA development fund
  - Possible cost reductions with putative recession?