

EVLA Operations

Jim Ulvestad

Array Science Center Concept Requirements Staffing and Cost Plans



Array Science Center Vision



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- ALMA is raising the bar on expectations for data delivery and science support for all astronomers
 - Such a vision was not clearly defined at the time of initial EVLA proposal in 2000
 - All NRAO telescopes should provide similar levels of services
 - Array Science Center for EVLA/VLBA will play a scientific leadership role in cm-wavelength astronomy
 - Algorithm & hardware development, science research support, visitor programs, engagement with community in planning future programs
 - Challenge: Carry out an Array Science Center development without breaking the bank!



Routine Operations Requirements



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- Operate both EVLA and VLBA, with associated gains in cost efficiency
 - Maintain EVLA capability until 2030
 - Retain all 7 configurations (A,B,C,D + hybrids)
 - 95% reliability in scheduled antenna-hours
 - 70% of hours in year for peer-reviewed science
 - 1-50 GHz and 327 MHz bands available year-round
 - Primary dynamic scheduling, with fixed observations also possible



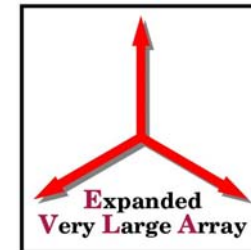
Science Center Requirements



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- Enable non-radio astronomers to carry out observations that reach their science goals
 - Provide calibrated data & reference images for most observations, and science-quality images for standard modes, with on-line archive
 - Support transportable post-processing package, plus in-house capability to process the most demanding observations
 - Provide expert scientific staff in supportive research environment
 - Fund page-charge support, meetings, postdocs, visitor program
 - Provide instrument renewal budget and associated teams
 - Provide research grants, up to level recommended by decadal panel
 - Operate Education Center (separate funding for construction)



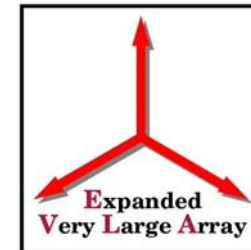
Operations Personnel Summary



Function	FTE (2000)	FTE (2012)
Array Science Center	30	62
Assistant Director's Office	5	4
Business Services	9.5	8
Array/Correlator Operations	25	19
Electronics	73	65
Engineering Services	52	48
Computing Infrastructure	9.5	10
Operational Software	9	11
(Education Center)	(1.5)	(8.5)
TOTAL (without Education Center)	213	227



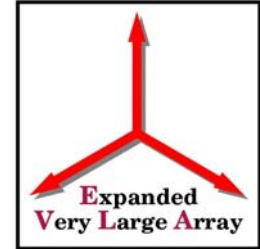
Array Science Center Personnel



Function	FTE (2000)	FTE (2012)
Mgmt/Admin	2	6
EVLA/VLBA Sci. Support	13	9
User Support Services	3	6
Post-Processing + Algorithms	10	9
Pipeline/Archiving/Computing	0	6
Data Services	2	9
Software Support/Testing	0	2
Postdocs/visitors	0	8
H/W Development; New Initiatives	0	7
TOTAL	30	62



Operations Personnel Plan, 2006-2012

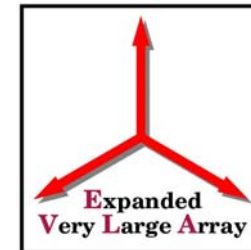


- Exclusive of full Array Science Center (annual increments not yet staged)

Year	FTEs	Comment
FY06	171	Current value
FY07	176	EVLA scientific commissioning
FY08	185	Commissioning; CASA to Ops
FY09	190	Carpentry, painting at VLA
FY10	192	EVLA Computing to Ops S/W
FY11	194	
FY12	195	Baseline science support only



Annual Ops/Infrastructure Costs

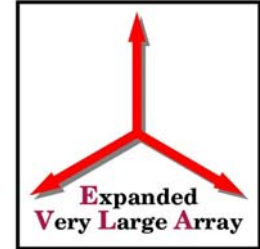


- All costs in dollars of year (FY05\$ for 2005, FY12\$ for 2012 costs)
- FY05 cost includes pro-rated share of past infrastructure augmentations (FY05 direct budget totaled \$4.0M)

Function	Cost (2005)	Cost (2012)
M&S, Facilities, Travel	\$3.2M	\$3.9M
EVLA Power	\$0.6M	\$1.6M
AOC Power	\$0.3M	\$0.5M
VLBA Power	\$0.4M	\$0.7M
Added VLA-AOC Bandwidth	\$0.0M	\$0.1M
TOTAL	\$4.5M	\$6.8M



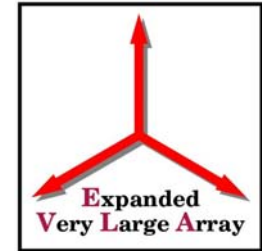
Additional Array Science Center Costs



Activity	Annual Cost (FY12\$)
Archive Storage/Bandwidth	\$0.2M
Computing H/W	\$0.1M
Page Charges	\$0.17M
Visitor Travel	\$0.24M
EVLA Meeting	\$0.05M
Instrument Renewal	\$3M-\$5M
Grants	??
Education Center	\$0.0M
TOTAL	\$3.8M-\$5.8M + grants



Total EVLA/VLBA Ops Costs (FY03 \$\$)



Function	2000 (03\$\$)	2012 (03\$\$)	2012 (12\$\$)
Personnel -- nominal science support (213 FTEs in 2000, 195 FTEs in 2012)	~\$14.9M	~\$13.6M	~\$18.5M
M&S, facilities, power, travel	\$4.2M	\$5.0M	\$6.8M
Subtotal -- present science support	~\$19.1M	~\$18.6M	~\$25.3M
Science Center Added Personnel	\$0M	\$3.1M	\$4.2M
Science Center Added Costs	\$0M	>\$2.8M	>\$3.8M
Grants	\$0M	??	??
Subtotal – Science Center extras	\$0M	>\$5.9M	>\$8.0M
TOTAL	\$19.1M	>\$24.5M	>\$33.3M