EVLA Science Operations: the Array Science Center

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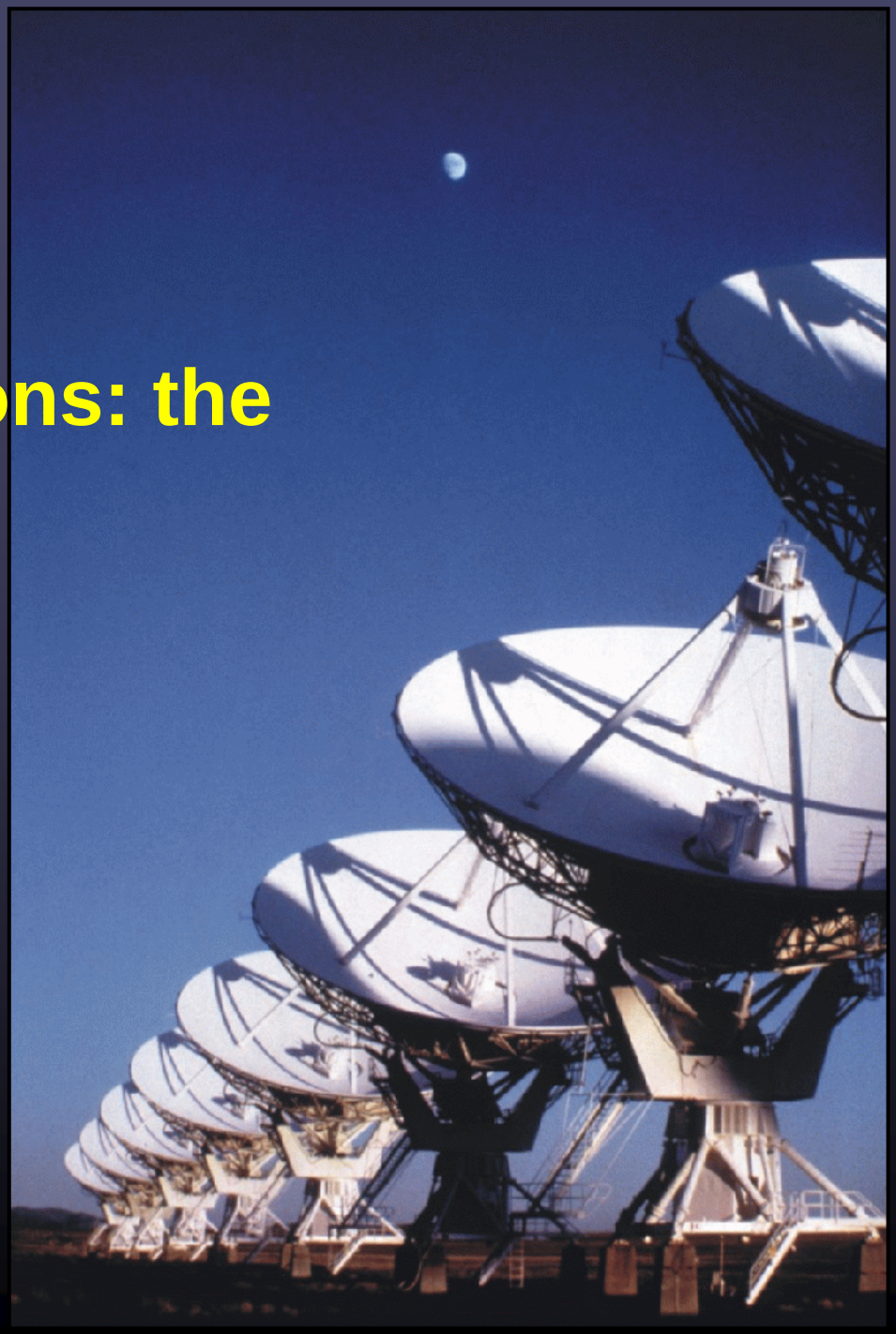


SAGE meeting

Socorro, May 22-23, 2007

The need for an Array Science Center

- The VLA/VLBA currently supply users with raw visibilities, provide some assistance in obs prep and data reduction
- Expectations of users are much higher these days
- In 2000 the EVLA Phase I proposal assumed re-use of existing NRAO personnel in Socorro Operations and the Data Management Division (now E2E) to provide *full support* for users
- The NAASC will provide *full support* for ALMA users
- A similar Science Center is needed for EVLA/VLBA
  - The EVLA will be an extremely powerful instrument, and we need to provide the support required to ensure it meets its science potential
  - Users should have similar experiences using all NRAO telescopes
- How might we achieve these goals?
  - An Array Science Center to support EVLA/VLBA in Socorro
  - Or (more likely) an Integrated Science Center for ALMA/EVLA/VLBA (and GBT?) with expertise shared across the observatory

Goals of the ASC (1)

- A draft plan for an Array Science Center to support the needs of EVLA and VLBA combines services from:
  - Socorro Scientific Services Division (EVLA and VLBA science support, user support, post-processing software support)
  - Socorro Operations (e.g., data analysts)
  - E2E (e.g., archiving, pipelines, algorithm development)
  - Science and Academic Affairs (postdoc and visitor programs)
- To address the realities of available resources we divide the primary ASC requirements into "core" functions and "full" functions
- The goals of the ASC are to provide:
  - (Full) support of proposal and observation preparation
  - Pipeline-calibrated data and reference images for at least 80% of EVLA and VLBA observations; science quality images for a well-defined set of standard observing modes and bands
  - Online archive of raw and pipeline-calibrated data plus reference images, available both from NRAO and via NVO or similar

Goals of the ASC (2)

- …ASC goals continued:
  - Robust and portable post-processing data analysis package, including pipelines and algorithms needed for EVLA data
  - Computing hardware and software capabilities for visitors to produce scientific results for any observation
  - Expert scientific staff
  - Full page-charge support, and travel support for observing and data reduction, for eligible US-based investigators using EVLA or VLBA
  - At least one science symposium highlighting EVLA science per year
  - Two EVLA/VLBA postdocs per year
  - A visitor program equivalent to 2 FTEs per year
  - An instrumentation-renewal budget
  - A team to develop new cm-wavelength instrumentation both for NRAO telescopes and new community initiatives
  - An environment supportive of research for its scientific staff

Commonalities with the NAASC

- Many of the goals of the ASC are clearly in common with the NAASC
- Some are already shared between EVLA and ALMA
  - EVLA and ALMA already share support of CASA (post-processing and algorithms)
  - Archive shared between EVLA and ALMA
  - Proposal submission, observation preparation
- Other potential commonality with the NAASC
  - Postdocs
  - Visitor program
- Distribution of instrument support across NRAO sites?

Models for reduction of EVLA data

- At least initially, it is unlikely users will have the computing capabilities on their desktops to reduce EVLA data (cf. early VLA)
- Models for supporting reduction of EVLA data:
  - NRAO staff reduce all EVLA data
  - All observers come to Socorro to reduce data
  - Users access computing facilities remotely
- If NRAO is limited to providing the core functions of the science center, it will also:
  - Hold regular workshops for users specifically on using the EVLA and associated tools (separate from the Synthesis Imaging Workshops)
  - Combine workshops with annual science meeting or SIW

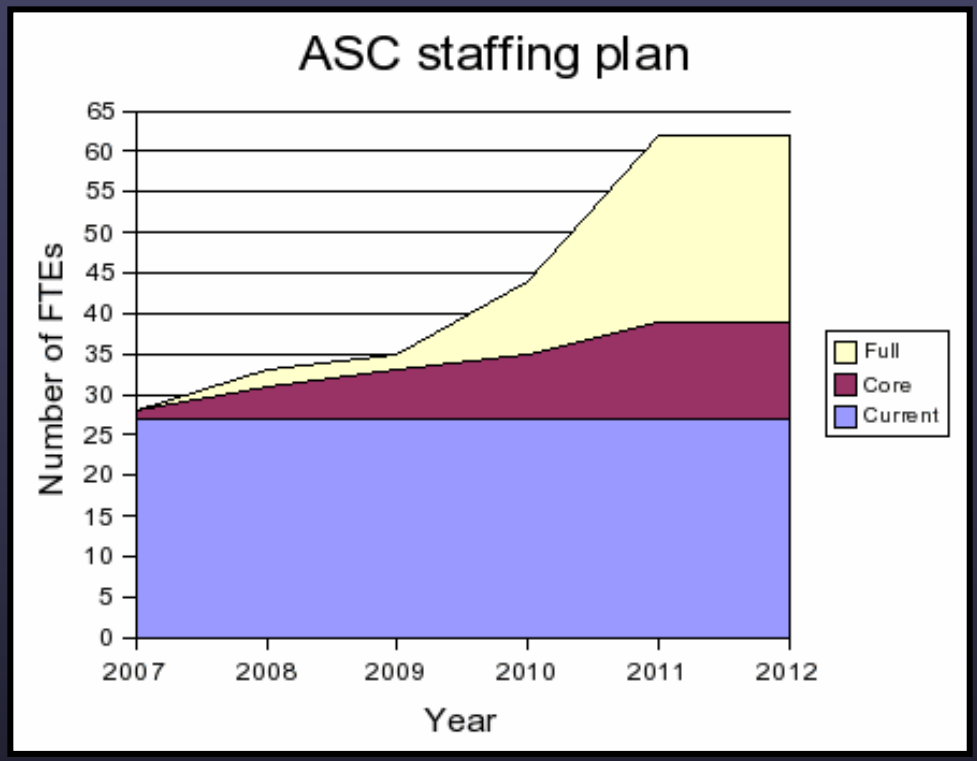
Achieving the goals of the ASC

- Even the “core” functions are beyond what we have traditionally provided for users in the past; core Science Center includes 27 existing NRAO staff plus 12 new hires
- “Full” science center would require a further 23 FTEs
- Staffing costs of the ASC (salary and benefits only):
  - Current staff: $3.2M per annum (2007$)
  - Additional “core” staff: $1.0M per annum
  - Additional “full” staff: $1.9M per annum
- Note: above is distinct from Socorro *Operations* costs (which includes Array Operations and engineering support); “current” staff above is ~20% of full operations cost of VLA and VLBA

ASC staffing summary

Function	FTEs in Jan 2000	Current FTEs	ASC/core FTEs	ASC/full FTEs
Management/admin	2	2	4	6
EVLA science support	7	6	5	5
VLBA science support	6	3	4	4
User support services	4	3	6	6
Post-processing support	10	6	6	6
Algorithm development	0	1	3	3
Pipelines	0	1	2	2
Archiving (incl. NVO)	0	2	2	2
Computing maintenance	0	0	2	2
Software support/testing	0	2	2	2
Data services	0	1	3	9
EVLA/VLBA postdocs	0	0	0	6
Scientific visitors	0	0	0	2
Hardware development	0	0	0	5
New initiatives	0	0	0	2
Total:	29	27	39	62

Staffing timeline



- Where we are now:
  - 1 postdoc starting in July (EVLA science support initially)
  - FY08 “core” needs: 1 scientist for VLBA science support, and 2 for algorithm development; “full” needs: 2 FTEs of visitors

EVLA Operations vs Commissioning

- The staffing plan for the ASC aims at achieving appropriate staffing levels for EVLA Operations in 2011
- It does not address the needs of EVLA commissioning
  - We requested 6 FTEs in FY07 for hardware/software commissioning and scientific acceptance tests
  - We were given 2 FTEs: one postdoc starting in July, one assistant scientist TBD
- We need more scientists to commission the WIDAR correlator in 2008-2011 than the ramp up needed for operations; “expert” visitors over the next couple of years?
- Full EVLA functionality may not be available until several years after the construction project is complete
- Advice from SAGE is sought on priorities for observing modes at the start of operations