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Response To Report On NRAO CASA And CASA-Based Pipelines

PREPARED BY	ORGANIZATION	DATE
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I INTRODUCTION

We thank the committee for their time and effort, it is clear from their recommendations that they have clearly understood the current status of the CASA project and the competing priorities influencing the project. The recommendation to focus on software engineering fundamentals and delivery of capabilities in support of the VLA and ALMA telescopes is very clear, and we agree on the primacy of these initiatives.

I address each of the specific recommendations from the committee below, although for most I simply note that we agree with the recommendation.

2 RESPONSE TO SPECIFIC RECOMENDATIONS

2.1 Requirements management needs a well-defined, documented, and director-approved governance process.

Agreed. We will work with the Data Management Software Department and Program Department leadership to define and document an appropriate software development methodology for CASA, meeting the requirements of the CASA team and our stakeholders, including ALMA management.

2.2 Requirements that include both research and development components need a sanctioned way to create a combined scientist/development team for impact analysis (as well as implementation and verification).

Agreed, this transcends the CASA team and requires a coordinated response from the observatory.

2.3 The emphasis and prioritization of requirements across the programs needs some rebalancing.

We think that this refers to the balance of effort between research and implementation effort. We agree with this assessment, again this will require a coordinated response from the observatory.

3.1 The CASA project should define, implement, and refine a formal software engineering process.

Agreed. (See R2.1)

3.2 A decision making body, such as a Change Control Board (CCB), should be established to manage changes and enhancements to the CASA baselines, and to make its decisions and schedules public.

Agreed. Large changes (either in absolute lines of code or in terms of scope) will be reviewed by a CCB, however not every (small) change will be reviewed.

3.3 A software architect, software testers, and possibly a software configuration management specialist should be added to the development team.

Agreed, based on the committee's exit interview I have already put in place a system architect and have converted one open position to a software test position.

3.4 Prior to any major CASA enhancements or initiatives, the architect should conduct an independent architectural review of CASA.

Agreed, we have already started the process of documenting the existing architecture and identifying regions of concern.

4.1 The structure and underlying design of CASA are important areas of concern that should be reviewed and assessed as a high priority by the (proposed) CASA architect.

Agreed.

4.2 Future support for CASACore is at risk and needs a mitigation plan.

Agreed, our newly appointed system architect has just completed meeting with other major stakeholders of the CASACore, discussing long term maintenance and collaboration.

5.1 The CASA team should commit to supporting development of a suite of robust, well-tested pipelines that start from the raw data and follow through to imaging, and should not hesitate to start the development of an imaging pipeline as soon as possible. Additional science and testing resources should be allocated to the pipeline effort.

Agreed, we will work with NRAO management to identify additional resources that can be dedicated to this effort.

5.2 CASA software should continue to support interactive reduction and maintain the flexibility to allow expert users to maximize the capability of the telescopes.

Agreed.

5.3 Parallelization of the calibration pipelines should be considered only if driven by specific ALMA or VLA requirements. The current FTE estimates for supporting parallel processing need to be vetted through more detailed study, included scaled prototype implementations.

Agreed, currently there is no mandate from the projects for this capability a thorough design and costing effort will precede any implementation.

5.4 A model of the operational modes of ALMA and the VLA should be developed in order to better project data rates and anticipate potential processing bottlenecks.

Agreed.

6.1 Incremental improvements in the capabilities of the CASAvier, driven by ALMA and VLA requirements, should continue. We recommend against exploring a major rewrite of the core architecture.

Accepted, we will not undertake a major rewrite, although I expect that we will need to address some architectural issues to address robustness and functional issues.

6.2 Collaborations with other groups sharing interests in visualization are encouraged.

Agreed.

7.1 Provide SIAP V2 support in the CASA Viewer.

Agreed.

7.2 Add SAMP capabilities to the CASA Viewer.

Agreed.

7.3 Provide the VAO pure Python bindings to VO services and the VOClient package as CASA add-ons.

Agreed.

7.4 Incorporate VOClient capabilities into other CASA applications.

Agreed.

7.5 Focus on those VO-related efforts that give the most benefit for the least effort and without a major diversion of internal resources.

We agree with the prioritization for the previous four initiatives (7.1-7.4) as given by the committee and will guide our effort by the principle stated here. R7.1 is already entering an early design stage remaining recommendations will be addressed as resources allow.

8.1 Investing significant effort in support of low-frequency arrays is not sufficiently justified at this time. The noted exception would be work associated with supporting a low-frequency upgrade to the VLA, although such efforts would need to be assessed and understood before proceeding.

Agreed.

8.2 Additional work in CASA on behalf of projects such as LOFAR, MeerKAT, and ASKAP, etc., should be undertaken only if additional development resources, whether internally at NRAO or externally from the projects themselves, can be provided. If NRAO can make small scale changes in CASA to support these other telescopes at low-cost, it should do so since this support can only benefit the broader community and increase adoption of CASA. Support for the CASACore libraries should be continued.

Agreed.

8.3 Significant work to support SKA does not seem appropriate at this time.

Accepted.

8.4 Supporting the high data rate cases for ALMA and the EVLA is important, and is a sufficient step forward for now toward SKA-scale data processing.

Agreed.

9.1 Gradually develop VLBI reduction capabilities, such as basic fringe fitting, beginning with areas of overlap with ALMA and VLA requirements.

Agreed.

10.1 Further additions to CASA driven solely by the GBT requirements are low priority.

Agreed.

10.2 NRAO/GBT staff should monitor CASA developments in support of the ACA, in consideration of an eventual adoption of CASA for single dish data processing and analysis.

Agreed, we will work with the staff at the GBT to ensure they are aware of developments in the CASA single dish capabilities.

11.1 There is no near-term urgency for significant action in supporting remote or cloud-based computing, nor is there a need to make any immediate decision about how to handle large-scale processing.

Agreed.

11.2 A model for, or projection of, the expected data rates expansion should be developed to provide a rational basis for decisions regarding the tradeoffs between local processing, data transfers, and the utilization of supercomputer centers.

Agreed.

11.3 It is appropriate at the present time to perform a low-effort study of the options for supporting high data rate operations in preparation for the next hardware refresh.

Accepted.

11.4 NRAO should recommend a standard stand-alone workstation system configuration (cpu, memory, disk configuration) that gives a reasonable price/performance return. This specification can later be expanded to include a standard small cluster configuration.

Agreed, the current understanding of the NRAO/CASA team on optimal hardware is maintained online (http://casa.nrao.edu/casa_hardware-requirements.shtml) and will be updated as appropriate.

11.5 Work to improve CASA's scalability should for now only be undertaken if driven by the needs of ALMA or EVLA data rates.

Agreed.