Telescope Time Allocation Tools

Execution Plan

Project: 688

PREPARED BY	ORGANIZATION
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CHANGE RECORD

VERSION	DATE	SECTIONS	CHANGE DESCRIPTION
2.0	6/17/2020	5	Incorporated feedback from CoDR

Table of Contents

1 INTRODUCTION

The overall development plan and project life cycle stages for the TTA Tools Project are described in the TTA Tools Project Management Plan [AD01]. The project scope is defined by the Project Charter [AD02] and refined by the System Concept [AD03] and System Description [AD04] documents. This document presents the associated cost in section 2 and a preliminary schedule in section 3. The work packages used in the estimation process are defined in sections 4, 5, and 6. Additional details about the effort estimates, and the phase definitions can be found in the appendices.

1.1 Applicable Documents

[AD01] TTA Tools Project Management Plan 688-TTAT-003-MGMT
[AD02] TTA Tools Project Charter: 688-TTAT-001-MGMT
[AD03] TTA Tools Concept: 688-TTAT-002-MGMT
[AD04] TTA Tools System Description: 688-TTAT-004-MGMT

1.2 Reference Documents

[RD01] TTA System Description 688-TTAT-004-MGMT
[RD02] Telescope Time Allocation (TTA): Walkthrough 688-TTA-010-MGMT

2 Effort Estimate

TTA Tools is an operations project, i.e. the effort for the development, design, implementation, and testing is drawn from existing observatory resources. The "cost" associated with the project is best measured in terms of the effort required from the existing observatory teams.

The Project Scientist, DMS Architect, and SSA Group Lead have provided effort estimates for each of the steps in each functional implementation phase (phases are defined in section 4). Estimates were expressed in FTE-weeks, and converted to FTE-years assuming 43.5 FTE-weeks in a year. Those estimates combined with the labor estimates in sections 5 and 6 are summarized in Table 1.

	Total Effort (FTE-Years)	Program Office	Scientific Staff		Development Effort	
			NRAO	GBO	NRAO	GBO
Functional Development	**8.49**		**1.76**	**0.47**	**4.52**	**1.75**
Logical Design and Validation	0.74		0.13	0.02	0.38	0.21
Minimum Viable Product	6.28		1.24	0.43	3.29	1.31
Feature Development	1.48		0.38	0.02	0.85	0.23
User Experience	**1.30**		**0.27**	**0.13**	**0.90**	
Logical Design Initiation	**0.14**				**0.14**	
Technical Debt	**2.59**		**0.53**	**0.14**	**1.38**	**0.53**
Integration	**1.06**		**0.11**	**0.02**	**0.69**	**0.23**
Operations Readiness Testing	**0.32**		**0.23**	**0.09**		
Training	**0.48**	**0.07**	**0.28**	**0.07**	**0.07**	
Management	**1.50**	**1.50**				
Total	**15.88**	**1.57**	**3.18**	**0.93**	**7.69**	**2.51**

Table 1 Summary of project effort estimates. All values are expressed in FTE-years.

The detailed estimates for each step in each phase and the allocation to specific groups can be found in Appendix C.

3 Summary Schedule

The TTA Tools project is resourced out of existing operational staff and relies on in-kind contributions for labor. A preliminary schedule, based on estimated work package labor and resource availability, is shown in Table 2[1]. The scope for this project is largely fixed (we must replace the functionality of the existing suite) and the availability of resources is determined outside of project control, thus schedule is the free parameter and will be adjusted based on availability of resources. The schedule is particularly sensitive to the availability of the scientific staff for requirement definition and validation.

The objective of this schedule is to set the overall time table for the project. UX development as described in section 5 is assumed to proceed in parallel and complete on a schedule similar to the one in the table. Training activities will be scheduled at the appropriate time and are assumed to have manageable impact to the schedule below.

Development Phase	Duration (Calendar Days)	Target Completion
Logical Design Initiation	35	4/30/2020

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[1] The schedule summary presented was derived using a resource loaded MS Project model. The model will be used throughout the project to track and refine the schedule.

Phase 1: Logical Design of Solicitation and Proposal Submission	37	6/22/2020
Phase 2: Logical Design of Observatory Site Review and Allocation Disposition Creation	35	7/6/2020
Phase 3: Logical Design of Allocation Approval, Project Creation, and Process Closeout	38	7/20/2020
Integration 1	16	8/11/20
Technical Debt 1	46	9/29/20
Phase 4: Solicitation Definition	42	10/16/20
Phase 5: High Level Proposal Entry	48	11/4/20
Phase 6a: Science and Feasibility Reviews	43	11/27/20
Phase 6b: Consensus Meeting	37	12/11/20
Technical Debt 2	46	2/12/21
Phase 7: Proposal Close Out	41	3/2/21
Integration 2	16	3/18/21
Phase 8a: Source Information	95	5/21/21
Phase 8b: Time Constraints	79	6/3/12
Phase 9: Global User IDs	84	7/1/21
Technical Debt 3	91	7/23/21
Phase 10: Proposal Submission and Vetting	82	8/2/21
Phase 11a: Solicitation Definition	114	1/7/22
Phase 11b: Observation Specification	106	2/24/22
Phase 12: Complete Review Process	91	3/3/22
Technical Debt 4	91	3/16/22
Phase 13a: Time Allocation Committee Preparation	123	9/6/22
Phase 13b: TAC Meeting Support	78	9/20/22
Phase 14: Project Creation	109	11/30/22
Integration 3:	16	12/22/22
Operational Readiness Testing	13	12/27/22
Technical Debt 5	46	3/1/23
Phase 15: Past Project Migration	33	3/7/23
Phase 16: SRDP Capability Development-1	72	6/16/23
Phase 17: External and Sponsored Proposals	52	6/23/23
Technical Debt 6	55	7/10/23
Phase 18: SRDP Capability Development-2	75	10/23/23
Phase 19: Create Proposal from Previously Withdrawn	58	11/3/23
Technical Debt 7	66	11/23/23
System Integration	32	12/25/23
Operational Readiness Testing	13	12/28/23

Table 2 Estimated completion dates for functional development.

4 Capability Implementation Package Definitions

This section defines the capability implementation work packages for the project, i.e. those work packages focused on adding additional functionality to the developing system. The mapping of system level requirements to the phase they will be addressed in, and the architectural elements that will be implemented in each phase are defined in appendix A and B. Each implementation phase is assumed to proceed through the 7 steps defined in the TTA Project Management Plan [AD01]. For each phase, the overall objectives of the phase and an estimate of the required effort are provided. Caveats, exceptions, and other scope modifications for each phase are included to ensure uniform expectations across the project.

The development of the functionality is divided into three segments, based on the overarching objective to be developed through the member phases.

4.1   Logical Design and Validation

The objective of this segment is to develop the logical architecture of the system through development of a working skeletal framework. Document 688-TTA-010-MGMT, "Telescope Time Allocation (TTA): Walkthrough", provides realistic scenarios, inputs, and outputs for each component needed to execute the TTA process. The scenarios will help guide logical design development and support prototyping the walking skeleton. The inputs and outputs will be used to develop unit tests which will be used to verify the prototype code. The Project Scientist will lead code validation via interactive testing. Although decisions about the physical architecture of the system can be delayed, it is anticipated that some choices will be required in this portion of the project.

At the end of this portion of the project all processes should be able to be completed, although in a minimalist and superficial manner, often using command line or other simple interfaces. After completion of the Logical Design phase, the effort estimates for the remaining phases will be reviewed and adjusted based on experience during this segment.

Phase 1: Logical Design of Solicitation and Proposal Submission

Objective: Design and prototype logical architecture to support solicitation and proposal creation.
1. The system shall support definition of multiple concurrent solicitations.
2. Users shall be able to create proposals containing all proposal information except:
    a. Interaction with the A³ component is not required, proxy user identification is sufficient.
    b. Capabilities and Allocation Requests are stubs consisting of just the facilities and the time requested.
    c. Scientific Justification need not be populated with actual PDF files.
3. Proposals shall be able to be created, edited, submitted, withdrawn and duplicated.
4. The ability to validate the software through creation and submission of test proposals and the subsequent removal of proposals when the solicitation is opened shall be demonstrated.

Phase 2: Logical Design of Observatory Site Review and Allocation Disposition Creation

Objective: Design and prototype logical architecture to support a review and time allocation process.

1. Review processes shall be able to be configured on a per solicitation basis.
    a. Review process will be observatory site review.
2. The results of the review shall be entered and persisted, and an allocation disposition created.
    a. Results shall be entered via a GUI interface. The primary goal is to demonstrate the architectural connections between the UX and application layers.
3. Allocation Dispositions shall contain recommended allocation at the Observing Specification Disposition level, although this is simplified with respect to the final state.

Phase 3: Logical Design of Allocation Approval, Project Creation, and Process Closeout

Objective: Design and prototype the logical architecture to support the allocation approval, creation of observing projects, and the closeout of the proposal process.
1. Generation of metrics and reports (subject to available meta-data)
2. Export of csv-formatted spreadsheets containing proposal and allocation information.
3. Modification of Allocation Dispositions by member of TTA Group.
4. Recording of acceptance by the director or designee.
5. Configurable generation and distribution of disposition letters.
6. Creation of observing projects for proposals with positive disposition.
    a. Note that this is a stub project. The intent is to demonstrate that the path to the telescope systems exist and do a minimal population of the project.

4.2 Minimum Viable Product Development

The second segment of development focuses on developing a replacement for the existing tool suite. At the end of this portion the tool suite shall be able to support the full life cycle for both semester and directors discretionary time solicitations. Automated testing begun in the Logical Architecture development is expanded to cover the additional functionality developed in each phase. Incremental validation of each phase is led by the project scientist.

Phase 4: Solicitation Definition

Objective: Production level specification of multiple concurrent solicitations.
1. Capabilities will be represented by simple stubbed proxies.
2. Only the observatory site review process may be specified.

Phase 5: High Level Proposal Entry

Objective: Population of the Proposal Information, Author, and Technical Justification portions of proposals.
1. Author information will be in a primitive state as the author information service is not yet available.
2. Allocation requests will continue to be stubs as in Phase 1.
3. Production level performance of service does not need to be demonstrated at this time.

Phase 6: Panel-Based Review

This phase is broken into two sub-phases each of which follows the full seven step process.
Objective: Implement the NRAO dual anonymous review process.

Phase 6a: Science and Feasibility Reviews

Objective: Implement the Individual Science and Feasibility review processes.
1. Automatic Conflict detection will be based on string comparison rather than Global Author ID

2. Filters for assigning feasibility reviews are not yet required.
3. User roles may be by assertion (e.g. users may define themselves to be members of the TTA Group)

Phase 6b: Consensus Meeting

Objective: Implement support for the NRAO Consensus Review.
1. User roles may be by assertion (e.g. users may define themselves to be chair of the science review panel)

Phase 7: Proposal Close Out

Objective: Implement the Proposal Close Out Process
1. Because there are no "real" proposals at this stage the system shall:
    a. Expose public information through an internal test interface
    b. Allow a modified notification scheme to prevent extraneous e-mails.
2. Disposition Letters will not contain the full allocation information (as it has not yet been entered).

Phase 8: Allocation Requests

Objective: Add all functionality not association with capabilities to the allocation request.
This phase has been divided into two sub-phases each of which will implement the seven steps.

Phase 8a: Source Information

Objective: Develop support for managing sources and fields in the allocation request**.**

Phase 8b: Time Constraints

Objective: Develop support for adding time constraints to an allocation request.

Phase 9: Global User IDs

Objective: Fully implement the Author Information Service and remove any dependency on the legacy User Database.
1. Other systems at the observatory have dependencies on this database, migration and mitigation plans should be in place for these dependencies.

Phase 10: Proposal Submission and Vetting

Objective: Demonstrate that the Proposal Service meets performance requirements. Finalize all submission and vetting related functionality.

Phase 11: Expert Capabilities

Objective: Implement an "expert" capability for each supported facility that allows capture of information at least at the same level as the current PST. At the end of this phase the solicitation and proposal processes are ready for use (MVP level).
This phase has been divided into two sub-phases each of which will implement the seven steps.

Phase 11a: Solicitation Definition

Objective: Fully specify and define the capabilities (specification constraints) to be offered for each facility.

Phase 11b: Observing Specification Entry

Objective: Allow full specification of allocation requests including the Observing Specification.
  1. This should include development of the sensitivity calculators for each telescope.

Phase 12: Complete Review Process

Objective: Bring review processes to full production level.

Phase 13: TAC Meeting Support

Phase 13a: Time Allocation Committee Preparation

Objective: Develop the functionality to support the preparation for the Time Allocation Committee meeting.

Phase 13b: TAC Meeting Support

Objective: Develop the interfaces used during the TAC meeting to create and modify the allocation dispositions.

Phase 14: Project Creation

Objective: Revisit project creation based on the full allocation disposition.
  1. Projects should be at least as complete as those created by the current suite of TTA tools.

4.3 Feature Development:

After Phase 14 the TTA tools suite may be available for use by the Observatory in routine operations. However there remain significant enhancements to fully satisfy the requirements of this project. The final segment of the implementation phase is intended to address these remaining issues.

Phase 15: Past Project Migration

Objective: Make proposals submitted through the current tool suite accessible within the new framework.
  1. At a minimum the title, and abstract shall be available.

Phase 16: SRDP Capability Development 1

Objective: Add less expert user capabilities to the system, decreasing the amount of information required to propose.
  1. Modes should include VLA Simple Continuum and a basic spectral line mode.
       a. Single configuration
  2. Automatic triggering of appropriate SRDP capabilities.

Phase 17: External and Sponsored Proposals

Objective: Productionize support for sponsored and external proposals throughout the system.
  1. Support should have been developed throughout the MVP segment, this phase is designed to ensure full compliance with requirements.

Phase 18: SRDP Capability Development 2

Objective: Expand the set of science ready capabilities.
1. Shall include multi-configuration VLA observation and appropriate combined imaging pipeline triggering.
2. May include simple VLBA Observations.
3. May include pulsar timing.

Phase 19: Create Proposal from Existing Proposal

Objective: Allow new proposal creation from previous proposals.
1. This will be done on a best effort basis; some information may not be able to be migrated.

5 User Experience Development

The user interfaces will be developed in a series of agile development cycles providing access to the capabilities developed in previous development phases. The architecture of the system is designed to decouple the UX system from the details of the domain system. We preliminarily identify the following user interfaces that will be required for the system for the purposes of planning and estimation, the actual UX design will be developed iteratively in the work packages.

- Solicitation Management UI: Used to configure, open, and modify solicitations.
- Proposal Entry UI: Used to create and modify proposals.
- Review Management UI: Used to configure and manage the review process
- Observatory Site Review UI: used to enter results from observatory site reviews.
- Panel Review UI: Used to conduct the panel review process
- Allocation Disposition UI: Used to create, modify, and accept allocation dispositions.
- Proposal Management UI: Used to vet proposals and otherwise administer the process.

Table 3 identifies those UI elements that will require updating subsequent to each development phase. Expectations are identified partial (P), suitable for the use of the minimum viable product (M), and complete (C). Based on this assessment, 26 UI development "sprints" will be required to develop the user interfaces. For estimation purposes we assume each of these sprints will last 3 weeks and require 50% of a UX development specialist and 15% of an interface specialist (scientist providing input on the user interface).

The user interface testing is intended to be integrated throughout the development process. UX testing will be included as part of the development, training, system integration, and operational readiness testing work packages. Further elaboration of this plan will be included in the to be written test plan.

UI Element	Count	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6a	Phase 6b	Phase 7	Phase 8a	Phase 8b	Phase 9	Phase 10	Phase 11a	Phase 11b	Phase 12	Phase 13a	Phase 13b	Phase 14	Phase 15	Phase 16	Phase 17	Phase 18	Phase 19
Count		0	1	0	0	1	2	1	1	1	2	3	1	0	1	3	1	1	1	0	1	0	1	1
UI Element	26	Logical			Minimum Viable Product															Features				
Solicitation management	3				P									M									C	
Proposal Entry	7					P				P	P	P			M						P		C	
Review Management	2						P									C								
Observatory Site Review	3		P									P				C								
Panel Review	5						P	P			P	P				C								
Allocation Disposition	2																P	C						
Proposal Management	4								P				P						M					C

Table 3 Phases requiring subsequent UX development by UI Element.

6 Non-functional Development Work Packages

A number of work packages do not lead directly to new functionality but nonetheless are important for the successful delivery of the project. Here we describe these "Non-functional" packages.

6.1 Project Management

Effort Estimate: 0.5 FTE (LOE)
Responsible for overseeing the execution of the project, this package includes effort in the system engineering and project management disciplines. This ongoing work is supported by the Project Director and Project Manager at the level of one-quarter FTE each.

6.2 Logical Design Initiation

Effort Estimate: 6 FTE-weeks (DMS)
After completion of the Conceptual Architecture phase, we will use the Logical Design Initiation to prepare for the Logical Design and Validation effort described in 4.1. This initiation effort will involve the DMS Architect, SSA Architect, and an SSA Software Engineer. The DMS Architect will review the requirements and walkthrough documents with the SSA team and ensure the SSA team understands the relation between the requirements and the conceptual architecture. The team will establish basic infrastructure related to development environments, revision control, and unit testing. The team will then use the conceptual architecture and walkthrough information to refine the architecture as needed and prototype the Solicitation package. With this foundation, the team will proceed with the phases defined in 2.1.

6.3 Technical Debt

Effort Estimate: 7 x 15 FTE-weeks
In software-intensive systems, technical debt consists of design or implementation constructs that are expedient in the short term but that set up a technical context that can make a future change more costly or impossible. Technical debt arises from numerous causes: unclear or changing requirements, implementation decisions, schedule constraints, and exterior causes outside the projects control. In order to manage the technical debt in the developing system seven periods have been identified to address technical debt in the system. We estimate the effort for each of these as the average effort of the development phases.

Specific technical debt items on the register will be identified and targeted in each of these periods with the specific objective of improving software quality.

6.4 Integration:

Effort Estimate: 3x 9.2 FTE-weeks + 18.4 FTE-weeks

Developing the system as a series of short phases focused on specific functionality risks "stovepipe" development. In order to mitigate this risk, the integration periods are planned which are designed to look at system issues and any gaps or mismatches that occur between development phases.

We schedule three preliminary integrations throughout the development process, each estimated at 1.2 FTE-weeks of scientific validation and 8 FTE-weeks of effort from the development team. A final system integration is planned prior to the Acceptance and Delivery phases, estimated at twice the effort as other integration phases. This is a final pass through the system to address punch list items before closeout and delivery.

6.5 Operations Readiness Testing

Effort Estimate: 2x 4 FTE-weeks
Two periods of Operational Readiness Testing are planned. One prior to deployment of the MVP and a second prior to closeout. These validation periods will be organized by the Project Scientist and will require effort from across Observatory Operations to ensure that all stakeholders agree the system is ready for deployment. We estimate approximately 1 FTE-week from the project scientist plus 0.5 FTE-week each from a technical staff member and the scheduler for each major facility (VLA, VLBA, GBT).

6.6 Training

Effort Estimate (Internal): 3x 3 FTE-weeks
Effort Estimate (External): 3x 4 FTE-weeks
While the new tool suite is intended to be both more useable and more intuitive than the previous suite, some concepts are new and there will undoubtedly need to be training provided both internally to the NRAO staff and externally to users of the facilities. NRAO conducts ongoing training of the community through community days and other events. This effort is the additional cost of developing new training tools, and an extra effort in training prior to the first use of the software.

For internal trainings 1-week of effort is allocated from each of the Project Scientist, Project Director, and a member of the development team. For external trainings the Project Scientist will lead a team with a scientific representative from each of the major facilities.

Appendix A: Architecture to Development Phase Mapping

The table below provides a mapping between the architectural components defined in the conceptual architecture and the functional development phases in which they will be refined and implemented. In this table a "P" denotes partial completion, a "M" denotes the phase at which the blocks must reach minimum viable product (MVP) level, and a "C" denotes the phase where the block is expected to reach completed status. The row and count columns give the number of non-empty blocks and was used to ensure that no single phase addressed too many portions of the system, or that a single component was being continually modified.

Block	Count	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6a	Phase 6b	Phase 7	Phase 8a	Phase 8b	Phase 9	Phase 10	Phase 11a	Phase 11b	Phase 12	Phase 13a	Phase 13b	Phase 14	Phase 15	Phase 16	Phase 17	Phase 18	Phase 19
	Count	51	10	6	14	4	27	10	9	8	5	3	1	13	6	10	10	6	8	8	7	26	8	8
		Logical			Minimum Viable Product															Features				
Solicit																								
Capability	6	P			P		P							M							P		C	
Capability Repository	3				P									M										
Facility	5	P					P							M							P		C	
Notification Group	2	P																				C		
Proposal Class	6					P								M						P		P		C
Proposal Process	6				P		P													P		P		C
Science Category	3				P		P																	
Solicitation	8	P			P		P			P				M						P		P		C
Solicitation Configuration File	6	P			P		P			P				M								C		
Solicitation Factory	5				P		P							M								C		
Solicitation Repository	6	P			P		P							M								P		C
Specification Constraint	6				P									M						P		P		C
Propose																								

Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
Document No: 688-TTAT-010-MGMT		Version: 2.0

Item	#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Allocation Request	9	P			P	P	P	P		M				P			P	C
Author	3	P							M									C
Data Processing Specification	3													P		C		
Observing Specification	6						P	P		M				P		C		
Proposal	3	P			P					M								
Proposal Factory	1	P																
Proposal Information	2	P		M														
Proposal Repository	2	P								M								
Request Specification	3						P	P										
Technical Justification	2				P													
Configure Review																		
Conflict State	3				P							C						
Feasbility Group Configuration	3				P							C						
Feasibility Review	6		P		P	P						M					C	
Feasibility Review Group	3				P							C						
Review Configuration Repository	4				P							M			C			
Reviewer	4		P		P							C						
Science Review	3				P							C						
Science Review Panel	3				P							C						
Science Review Panel Configuration	3				P							C						
Review																		
Comments Repository	6		P		P	P							M	P			C	
Conflict Repository	3				M					M							C	
ISR Repository	3				P	P					C							
Proposal Review	4		P			P					C							

Page 16

Item	Count	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Proposal Review Repository	4						P						M					P	C		
Score Repository	2					P							C								
Score	2						P						C								
Allocate																					
Allocation Disposition	7		P				P				P				M		P	C			
Allocation Disposition Repository	3		P				P								M						
Data Processing Disposition	3																P		C		
Facility Report	3			P																	
Observing Specification Disposition	5		P					P			P				M						
Pressure Plot	4							P			P			M							
Proposal Summary	5			P	P				P						M						
Approve																					
Approval Metrics	5			P			P								M		C				
CVS Report	5			P			P								M		C				
Director's Review Report	5			P			P								M		C				
Closeout																					
TAC Report	4						P							M			C				
Disposition Letter	5			P			P								M		C				
TAC Metrics	4						P								M		C				
Processes																					
Consensus Review Process	4			P			P						C								
Distributed Review Process	0																				
Observatory Site Review Process	4		P	P									M					C			
Review Process	9		P	P		P	P						P			P	M	C			

Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
Document No: 688-TTAT-010-MGMT		Version: 2.0

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Special Review Process	3				P													C			
Application Model																					
Author Information Service	2									C											
Proposal Review Service	4					P	P						M					C			
Proposal Service	13	P			P			P	P	P	P	P	M			P	P	P	P	C	
Review Configuration Service	4					P							M					C			
Solicitation Service	5		P		P							M						C			

	Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
	Document No: 688-TTAT-010-MGMT		Version: 2.0

Appendix B: Requirement to Phase Mapping

The table below maps the level 1 (system) requirements to the phase(s) that they will be addressed in. Label values are the same as in Appendix A (P-preliminary, M-MVP, C- Complete). The counts column was used to ensure that all requirements are addressed and that no single phase was addressing a dis-proportionate level of requirements.

Id	Text	Count	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6a	Phase 6b	Phase 7	Phase 8a	Phase 8b	Phase 9	Phase 10	Phase 11a	Phase 11b	Phase 12	Phase 13a	Phase 13b	Phase 14	Phase 15	Phase 16	Phase 17	Phase 18	Phase 19
Count			54	26	15	34	38	34	20	22	15	15	28	29	21	17	58	16	21	6	10	28	58	33	10
			Logical			Minimum Viable Product															Features				
00 Solicit																									
TTA-L1-1 Proposal Solicitation	The process begins when the observatory announces a solicitation to use observatory resources, typically a call for proposals to request time on one or more of Associated Universities Inc. (AUI) North American (NA) telescopes.	4	P			P									M								C		
TTA-L1-1.2 Support	The system shall support multiple concurrent	3	P			P									C										

Multiple Solicitations	proposal solicitations.		P		P								P					
TTA-L1-1.3 Solicitation Configuration	Many components of the solicitation will be configurable and the configuration history should be stored.	4	P		P								P				C	
TTA-L1-1.4 Configure Solicitation	Prior to the call for proposals the TTA Group will specify the parameters for the observing call.	4	P		P								M				C	
TTA-L1-1.4.6 Facility	Each Facility will have the following configurable attributes: 1. The technical justification cues. 2. If triggered observing is available and the list of triggered criteria. 3. A list of constraints.	7	P		P						P			P	M		P	C

TTA-L1-1.4.7 Capabilities	A configurable list of Capabilities shall be selected by the TTA Group. For example, on-the-fly mapping single-dish or single-field interferometry. Each of these is connected to a Facility (e.g., GBT and VLA). For each Capability the TTA Group will select the configurable list of resources and their constraints; that is, the Specification Constraints. For example, a list of the receivers for each Capability (e.g., L,S,X) and their constraints (e.g., frequency range).	5	P		P							M					P	C	

1 Solicit

ID	Description																											
TTA-L1-1 Proposal Solicitation	The process begins when the observatory announces a solicitation to use observatory resources, typically a call for proposals to request time on one or more of Associated Universities Inc. (AUI) North American (NA) telescopes.	4	P		P											M								C			
TTA-L1-1.2 Support Multiple Solicitations	The system shall support multiple concurrent proposal solicitations.	3	P		P											C											
TTA-L1-1.3 Solicitation Configuration	Many components of the solicitation will be configurable and the configuration history should be stored.	4	P		P											P								C			
TTA-L1-1.4 Configure Solicitation	Prior to the call for proposals the TTA Group will specify the parameters for the observing call.	4	P		P											M								C			

Req ID	Description	#																	
TTA-L1-1.4.6 Facility	Each Facility will have the following configurable attributes: 1. The technical justification cues. 2. If triggered observing is available and the list of triggered criteria. 3. A list of constraints.	7	P		P			P				P	M		P		C
TTA-L1-1.4.7 Capabilities	A configurable list of Capabilities shall be selected by the TTA Group. For example, on-the-fly mapping single-dish or single-field interferometry. Each of these is connected to a Facility (e.g., GBT and VLA). For each Capability the TTA Group will select the configurable list of resources and their constraints; that is, the Specification Constraints. For	5	P		P				M						P		C

example, a list of the receivers for each Capability (e.g., L,S,X) and their constraints (e.g., frequency range).

2 Solicit

TTA-L1-1 Proposal Solicitation	The process begins when the observatory announces a solicitation to use observatory resources, typically a call for proposals to request time on one or more of Associated Universities Inc. (AUI) North	4	P		P							M						C	

ID / Name	Description																		
	American (NA) telescopes.		P		P								C						
TTA-L1-1.2 Support Multiple Solicitations	The system shall support multiple concurrent proposal solicitations.	3	P		P								C						
TTA-L1-1.3 Solicitation Configuration	Many components of the solicitation will be configurable and the configuration history should be stored.	4	P		P								P						C
TTA-L1-1.4 Configure Solicitation	Prior to the call for proposals the TTA Group will specify the parameters for the observing call.	4	P		P								M						C

	Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
NRAO	Document No: 688-TTAT-010-MGMT		Version: 2.0

TTA-L1-1.4.6 Facility	Each Facility will have the following configurable attributes: 1. The technical justification cues. 2. If triggered observing is available and the list of triggered criteria. 3. A list of constraints.	7	P			P					P					P	M		P	C
TTA-L1-1.4.7 Capabilities	A configurable list of Capabilities shall be selected by the TTA Group. For example, on-the-fly mapping single-dish or single-field interferometry. Each of these is connected to a Facility (e.g., GBT and VLA). For each Capability the TTA Group will select the configurable list of resources and their constraints; that is, the Specification Constraints. For	5	P			P							M						P	C

	example, a list of the receivers for each Capability (e.g., L,S,X) and their constraints (e.g., frequency range).					
TTA-L1-1.25 DDT Proposal Classes	Currently the DDT Proposal Classes are "Exploratory", "Target of Opportunity", or "EPO". These have the following configurable attributes: 1. Size of the proposal title. 2. Size of the abstract. 3. Size of the	4	P	P	P	C

scientific justification 4. Available semesters to execute the observations.																													
TTA-L1-1.26 Demo Capabilities	Usually the capabilities are based on the current or upcoming solicitation.	3	P			P										C													
TTA-L1-1.27 Demo Configuration	In setting up a proposal solicitation the TTA Group lead will want to specify that this is not an official call and thus no review or time allocation processes will be created.	4	P	P		P										C													

ID	Description	#											
TTA-L1-1.28 Demo Notifications	Notifications to the PI and TTA memebers shall be configurable as part of the solicitation configuration. This shall include suppression or redirection of notifications.	4	P		P				M			C
TTA-L1-1.29 Demo Closeout	At the end of the workshop, the proposals may be removed from the system and shall not be linked to the users account (i.e., show up in their personal list of proposals).	4	P	P					M			C

01 Propose

ID	Description	#														
TTA-L1-2 Create Proposal	A proposal requesting time on one or more telescopes for a semester solicitation is the most common method of accessing AUI NA telescopes.	8	P			P		P	P		M			P	P	C

ID	Description	Pri	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
TTA-L1-2.1 Abstract Status	When a proposal is given positive a disposition the following information shall be public: Proposal ID, title, PI, Co-Is, science category, proposal type (e.g., Large), Approved hours, abstract, and the date/time submitted.	2			P				C													
TTA-L1-2.2 Re-Submission	A method of specifying if this is a RE-SUBMISSION should be available.	2				M																C
TTA-L1-2.3 Select Solicitation	The first action in the proposal tool must be to select the solicitation which sets the capabilities and the proposal process. The solicitations consist of "semester", "DDT", and "Special".	4	P			P								M						C		

ID	Description	Count	Markers
TTA-L1-2.3.1 Special Solicitation	A "Special" solicitation are for proposals that are reviewed by an external TAC or a sponsored proposal.	2	M, C
TTA-L1-2.4 Enter Proposal Information	A registered, authenticated user must be able to enter all of the information required to create a proposal.	9	P, P, P, P, P, P, M, P, C
TTA-L1-2.4.1 Proposal Information Ownership	All authors shall be able to modify all fields in the proposal.	1	C
TTA-L1-2.4.2 Enter Proposal Title	A text entry field defining the proposal TITLE shall be provided (word limit applies).	1	C
TTA-L1-2.4.3 Enter Related Proposal	A method of indicating any previous RELATED PROPOSALS shall be provided. To reduce the probability of mistakes, the title of any related proposal shall be displayed.	3	P, P, C

Requirement	Description	Pri																					
TTA-L1-2.4.4 Enter Science Category	Authors will specify a single SCIENCE CATEGORY from the list of categories defined for the observing cycle, through a drop down or similar interface.	1					C																
TTA-L1-2.4.5 Enter Proposal Abstract	A text entry field used to enter a proposal ABSTRACT shall be provided (word limit applies).	1					C																
TTA-L1-2.4.6 Validate Proposal Information	All text entry fields shall be validated for content to ensure the integrity of the proposal system. Text entry widgets shall accept Unicode input unless otherwise specified. Text fields may indicate that they have a word limit, in this case the limit should only be applied during the validation	12					P	P	P		P	P		P		P	P		M			P		P	C

	Description																									
	stage (although a warning could be produced earlier) to allow users flexibility when drafting entries.																									
TTA-L1-2.4.7 Enter Proposal Review Category	The system will allow authors to select a solicitation for which the proposal is in response.	3	P				M																	C		
TTA-L1-2.4.8 Enter Scientific Justification	Authors shall be able to attach and update a SCIENTIFIC JUSTIFICATION for each proposal.	2					P						C												

ID	Description							P							C													
TTA-L1-2.4.8.1 Scientific Justification Format	The justification must be submitted in a PDF format and is subject to a page limit specified at the proposal solicitation definition phase.	2						P							C													
TTA-L1-2.4.8.2 Scientific Justification Validation	The system will automatically validate the scientific justification conformance with requirements (Font, number of pages, etc)	2						P							C													
TTA-L1-2.4.9 Enter Student Project Information	Observations related to students THESIS PROJECT shall be indicated. This is a check box or similar mechanism.	2						P						C														
TTA-L1-2.4.9.1 Enter Student Project Details	If selected the student author should be identified, their projected graduation date retrieved from the Account System, and a check that a	1												C														

ID	Description																							
	thesis plan is on record for the student performed.																								
TTA-L1-2.5 Manage Allocation Requests	A method to add and remove Allocation Requests from the proposal shall be provided.	6	P									P	P			M					P	C	

| TTA-L1-2.5.1 Allocation Request Information | At the Allocation Request level, the capabilities of the solicitation must be defined. The resources that can be specified are given by the the REQUEST SPECIFICATION. For each REQUEST SPECIFICATION the set of capabilities must be defined. The set of capabilities is defined as the set of Front Ends, Back Ends, and SRDPs offered to the proposer, as well as the validation constraints to be used when validating these OBSERVATION SPECIFICATION components. It is expected that the Capabilities will changes slowly from one semester to the next so provision to modify a | 4 | | | | | | | | | | | P | M | | | | P | C |

previous semester's Solicitation to create new Solicitation shall be made.

| TTA-L1-2.6 Generate Proposal ID | A sequential PROPOSAL ID shall be generated for all proposals at submission. | 3 | P | | P | | | | | | | | C | | | | | | | | |

TTA-L1-2.6.1 Proposal ID Algorithm	The proposal ID shall be constituted by the unique solicitation identifier specified in the solicitation followed by a dash and then at least three-digit proposal ID number (e.g. 19A-023). If more than three digits are required to uniquely identify all proposals additional digits shall be used.	3	P			P							C														
TTA-L1-2.7 Author List Entry	For each proposal a list of associated authors shall be entered through the proposal tool. Author information is maintained in the NRAO account system (see x4.1) and shall be referenced from the proposal. The information associated with	3	P			P							C														

					P						C								
	the authors at the time of submission must be persisted.																		
TTA-L1-2.7.1 Default PI	Exactly one author shall be designated as PRINCIPAL INVESTIGATOR, by default the author initially creating the proposal shall be designated as the PI.	2			P						C								
TTA-L1-2.7.2 User Account	Provision shall be made to easily create user accounts for authors that do not yet have an account.	2			P						C								

TTA-L1-2.7.3 Author Information	When an author is added to a proposal all of the information in the author's profile should be associated with the proposal (e.g., this version of the profile is connected to the proposal). This profile information for all authors on the proposal should be updated when the proposal is submitted.	2												P	C														
TTA-L1-2.7.4 Designate Contact Author	Exactly one author shall be designated as the Contact Author; by default the author initially creating the proposal.	2					P							C															
TTA-L1-2.7.4.1 Contact Author Email	An e-mail address must be associated with the Contact Author's information in the account sub-system.	2					P							C															

Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
Document No: 688-TTAT-010-MGMT		Version: 2.0

ID	Description	#																				
TTA-L1-3 Authenticate User	The system shall authenticate users and ensure that only authorized modifications to the proposal are made.	3	P				P					C										
TTA-L1-4 Validate Proposal	The system shall validate proposals throughout the proposal process to prevent incorrect or inconsistent values from being stored. (Dup-L1-1.2.8)	11					P	P	P		P	P				P	P	M			P		P	C
TTA-L1-11 Configurability	The TTA system must use configuration files, interfaces, services, agents, etc to avoid hard coded values.	5	P	P	P	P											P						
TTA-L1-12 Download proposal information	Users must be able to download a PDF version of the proposal at each stage of the proposal process.	4					P										M				P		C

ID	Description	#																						
TTA-L1-14 Permissions	All authors on a proposal should have read/write privileges and there should be no locking for editing; we assume the collaborators are communicating about the proposal.	4					P				P	P	C											
TTA-L1-15 Administration Permissions	Appropriate administrators (e.g., TTA Group) will also have read/write privileges to be able to provide technical and scientific support.	9	P	P	P		P	P	P			P			P		C						
TTA-L1-16 UX	Container for user interface requirements.	5	P				P				P				M						C		
TTA-L1-16.1 View Multiple Proposals	Many users will be working on multiple proposals at once, so an interface to allow them to see all of their proposals and the current state of the proposals should be provided.	6					P				P	M								P		P	C

ID	Description	Priority	Markers
TTA-L1-16.2 Previously Submitted Proposals	Users should also be able to view and access previously submitted proposals.	3	P … M … C
TTA-L1-16.3 Submit Proposal	Before the deadline the PI (or any author) should be able to submit the proposal through an option in the interface.	2	M … C
TTA-L1-16.4 Submission Verification	Once submitted a verification dialog should immediately appear providing the assigned proposal ID and the time of submission.	1	C
TTA-L1-16.5 Author Notification	All authors should be notified of the submission.	3	P M … C
TTA-L1-16.6 Propsosal Deadline	After the proposal has been submitted, any author should be able to continue to edit and submit the same proposal up until the deadline.	4	P … P … M … C

Requirement	Description	#	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
TTA-L1-16.7 Withdraw Proposal	Only TTA group members can withdraw a proposal once submitted.	3	P											M					C	
TTA-L1-16.8 TTA Group Withdraw	A TTA Group member shall be able to withdraw a proposal at any stage. That is, the withdraw functionality is global.	7	P	P	P							P	P				M			C	
TTA-L1-16.9 Log In	A proposal begins when a registered user logs into the proposal tool and selects "semester" or "DDT" for the solicitation.	4	P				P				M									C	
TTA-L1-23 Final Proposal Version	The last version of the proposal submitted will be the final version.	3	P									M								C	
TTA-L1-24 Modification after Deadline	After the deadline and any specified grace period has passed the proposal may no longer be modified.	3					P					M								C	

TTA-L1-26 Author Permission	Collaborators may be added to the proposal as Co-Investigators without any direct permission.	1					C																

| TTA-L1-27 Proposal States | The software shall maintain a state for each Proposal throughout the proposal life-cycle. The following set of states is the minimum set to be made available to telescope users: 1. DRAFT: The proposal has been created but not yet submitted. 2. SUBMITTED: The proposal has been submitted. At this stage the proposal can still be modified and submitted again. 3. IN REVIEW: The proposal has been submitted and can no longer be modified. 4. COMPLETED: The proposal has been reviewed and time allocated. A disposition letter has been sent. | 7 | P | P | P | | | | | | | | | P | | P | M | | C | |

5. WITHDRAWN: The proposal has been withdrawn after submission. Once a proposal is withdrawn it becomes stale; that is, the proposal can not go to any other state.

TTA-L1-29 Create Proposal from Existing	It shall be possible, with best efforts, to create a new draft from a proposal in the WITHDRAWN or COMPLETED state.	1																										C
TTA-L1-30 Proposal Migration	Migration of existing proposals. At a minimum the user should have access to past (PST) proposal PDFs. We need a data model first to decide how best to import current data.	1																							C			

TTA-L1-33 External TAC Proposal	The process starts when the TTA Group is notified by an external facility that a proposal has been approved by their TAC for observations on an AUI/NA telescope. The TTA Group will create a Proposal and the corresponding Allocation Dispositions. A notification is then sent to the PI informing them to fill in the appropriate information; that is, the Allocation Requests. After the proposal is validated the Project can be created.	5					P				P		P	P			C		

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NRAO	Document No: 688-TTAT-010-MGMT		Version: 2.0

ID	Description		P													M								C	
TTA-L1-34 Notifications	Notifications shall be sent for successful submission of a proposal to the authors and the TTA group. Included should be the PROPOSAL ID, Proposal Class, TITLE, PI, CO-IS, SCIENCE CATEGORY, TIME SUBMITTED, and for each Allocation Disposition: the ALLOCATION REQUEST ID, the Facility, and if the proposal is TRIGGERED.	3	P														M								C	
TTA-L1-35 External TAC Proposal Notification	For External TAC proposals, a notification should be sent to the PI after the TTA Group has created a proposal informing them to complete the proposal.	1																							C	

TTA-L1-36 Vetting	It shall be possible for TTA members to identify proposals that require vetting and either indicate that they have been verified or move the proposal to the withdrawn state.	3	P													M										C		
TTA-L1-37 Solicitation Vetting	Proposals submitted for a semester solicitation should be vetted to check that they are indeed appropriate for such a solicitation...A TTA Group member shall be able to flag such a proposal and move it to the WITHDRAWN state.	1													C												

TTA-L1-38 Science Category Vetting	During the vetting process TTA members shall be able to view a subset of proposal content and modify the SCIENCE CATEGORY prior to marking the proposal as verified.	1														C												
TTA-L1-39 Solicitation Types	Tracking and required vetting of proposals shall be configurable as part of solicitation configuration.	2														M									C			

														M						C		
TTA-L1-40 Check Solicitation Boundary	There shall be a mechanism to check that the time of proposal submission is within the boundaries of the specified solicitation dates. For semester solicitations this is typically within one month leading up to the deadline; that is, users have about one month to create, edit, and then submit the proposal. There shall be a configurable grace period. For DDT proposals the system shall manage the date ranges automatically without requiring the author's input.	2												M						C		

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	Document No: 688-TTAT-010-MGMT		Version: 2.0

| TTA-L1-42 Science Category Vetting Interface | There shall be an interface to aid a TTA Group member to vet the SCIENCE CATEGORY of all proposals submitted for a semester solicitation. The interface should show: (a) PROPOSAL ID (b) TITLE (c) ABSTRACT The user shall be able to filter by the SCIENCE CATEGORY. There shall be a way to select a different SCIENCE CATEGORY before saving. There shall be a mechanism to save the SCIENCE CATEGORY for all proposals. The history of the SCIENCE CATEGORY shall be maintained; that is, there shall be a way to view the original | 3 | P | | | | | | | | | | M | | | | C | |

SCIENCE CATEGORY.

02 Review Configuration

TTA-L1-46 Science Review Panel Configuration	Prior to the beginning of the review process a TTA Group member will configure the science review panels (SRPs).	2	P	C

TTA-L1-47 Feasibility Review Configuration	Prior to the beginning of the review process a TTA Group member will configure the system to assign zero or more reviewers to evaluate the feasibility of each Allocation Request.	2		P			C																			
TTA-L1-48 Feasibility Review Assignments	To manage assignments the software shall support a mechanism to specify groups of reviewers that can be applied to one or more Allocation Requests.	3		P			P													C						
TTA-L1-49 Starting SRP Configuration	The starting configuration should be defaulted to a previous cycle's values.	1																		C						

TTA-L1-50 SRP Definition	Each SRP consists of a SCIENCE CATEGORY, SRP members, and an SRP chair. (A chair pro tem may be assigned at a later time.) There shall be two or more reviewers, consisting of SRP members and SRP chairs, assigned to each Proposal. A reviewer can only be on one SRP.	2					P								C							

TTA-L1-51 Data Management Review Configuration	The structure of data management reviews is similar to technical reviews, except that they will mostly likely only be performed on a small sub-set of Allocation Request. This determination will likely depend on reasonable logical combinations of TOTAL REQUESTED TIME, ESTIMATED PROCESSING, and ESTIMATED DATA VOLUME. It is very likely that these criteria will evolve over time, so reasonable effort shall be made to provide flexibility in the software.	3		P													M					C		
TTA-L1-52 Review Panel Setup Access	Only members of TTA Group shall be able to view and modify the Review Panel Setup.	3						P				P				M							

ID	Description	#																							
TTA-L1-53 Review Configuration File	It shall be possible to execute a configuration file. For example, for testing purposes a TTA Group member will want to automatically configure the system using a previous configuration file.	4		P			P										M				C				
TTA-L1-54 Applying Configuration File Changes	Changes to the number of reviewers, panels, or science categories shall not require a software update.	2		P			C																		

03 Review

ID	Description	#																							
TTA-L1-43 Semester Solicitation Review	Proposals submitted for a semester solicitation will be reviewed by a panel-based, dual-anonymous review process.	3							P	P							C								
TTA-L1-44 DDT Solicitation Review	Proposals submitted for a DDT Solicitation are reviewed by a local observatory site committee,	2	P																	C					

	typically organized by the scheduler.																								
TTA-L1-45 Special Solicitation Review	Proposals submitted for a "special" solicitation are not evaluated by the NRAO review process...but such reviews are handled outside of the TTA Tools and are therefore out-of scope.	3																					C		
TTA-L1-55 Review Process	The details of the review process varies depending on the proposal solicitation.	5	P	P		P												M					C		
TTA-L1-56 Proposal Access	SRP members shall only have access to proposals for which they are Available.	3						P				P			C									

TTA-L1-57 Automatic Proposal Conflict Identification	The system shall automatically generate a conflict designation for a given reviewer for any proposal that: (a) The reviewer is an author of the proposal.	3						P				P				C														
TTA-L1-58 Manual Proposal Conflict Identification	The first action of an SRP member, prior to viewing any proposals to identify potential conflicts of interest. The SRP member shall be provided with the PROPOSAL ID, the TITLE, and the ABSTRACT.	2						P								C														
TTA-L1-60 Author Information Visibility	Proposal author information should not be visible to SRP members at any time.	2						P								C														

Requirement	Description																								
TTA-L1-61 Proposal Display Options	To facilitate the review process, in addition to the online display of proposals they should be made available for SRP members and the TTA Group as: (a) Individual PDF files of each Proposal. (b) A tar file containing all of the individual Proposal PDF files. (c) A single PDF file containing all of the Proposals for the SRP.	7					P			P	P				P	M					P		C	
TTA-L1-62 ISR PDF Generation Options	The generation of the PDF should have the following options: (a) Full proposal. (b) Proposal Information content only. (c) Exclude FIELDS in the Allocation Requests.	7					P			P	P				P	M					P		C	

TTA-L1-63 Review Results Entry	It shall be possible for a reviewer to enter review results either directly through the review interface or via a file import. In either case values shall be validated upon entry: (a) The INDIVIDUAL SCORE for each Proposal shall be validated to be within range (currently defined on the open interval between 0 and 10, in one tenth point increments). (b) COMMENTS FOR THE SRP are variable length strings.	2						P								C								
TTA-L1-64 Notifications	1. When all reviewers in a given SRP have completed their individual reviews a notification should be sent to the SRP chair and the TTA group.	2						P								C								

TTA-L1-65 Proposal Review Types	There shall be the concept of REVIEW TYPE for each proposal/reviewer. The SRP chair shall assign a REVIEW TYPE for each proposal/reviewer. The review types consists of None, Primary, Secondary, or Tertiary. The default review type is None. The SRP chair should be able to re-assign the REVIEW TYPE at any time during the individual review stage.	2						P									C								
TTA-L1-66 Proposal Review States	There shall be a concept of REVIEW STATE for each reviewer/proposal. The REVIEW STATES shall consist of Not-saved, Saved, Complete, Closed.	2						P									C								

Requirement	Description							
TTA-L1-67 Proposal Review	The system shall support mulitple methods of proposal review, specified at the time of solicitation configuration.	4	P	P	M			C
TTA-L1-68 Observatory Site Review Process	The system shall support an observatory site review process where a TTA member enters all information for the review.	2		P				C
TTA-L1-69 Panel Review Process	The system shall support the science review panel process.	2				P		C
TTA-L1-70 Individual Science Review	The system shall support the individual Science review process.	2			P			C
TTA-L1-71 Monitor Review Process	The SRP chair shall be able to monitor the status of the individual scientific review process. Specifically to see if the reviewer is Conflicted or Available and to view the REVIEW	2			P			C

	TYPE and REVIEW STATE.							P									C											
TTA-L1-72 Complete Reviews	It shall be possible for a TTA Group member to complete all of the reviews for a given reviewer. This assumes a valid score has been entered; otherwise the review will be closed out; that is, not included.	2						P									C											
TTA-L1-73 Close Reviews	It shall be possible for a TTA Group member to close out all of the reviews of a given reviewer. A review that has been closed is no longer considered; that is, the score is not used in the normalization	2						P									C											

	process and the text is not shown.									P								C					
TTA-L1-74 ISR Score Generation	Once all reviews for a given reviewer are complete the NORMALIZED SCORE shall be generated which yields a mean of 5 and a standard deviation of 2.	2							P								C						
TTA-L1-75 Simulate ISR	A TTA Group member shall be able to simulate individual reviews for testing purposes.	1						C															

TTA-L1-76 Consensus Scientific Review	The panel-based review system requires that the panel discuss their individual reviews, which were performed independently, to form a consensus evaluation of the proposal; that is, a consensus scientific review. The outcome of the consensus scientific review is an SRP SCORE and comments both to the PI and internal comments. The TTA Tools shall provide the interface and functionality to help support the panel discussion.	2							P								C						

TTA-L1-77 CSR Score Generation	The NORMALIZED LINEAR-RANK SCORE shall be automatically computed by the system as 10R=n where R is the ordinal rank of the proposal based on the SRP Score (in ascending order) and n is the number of proposals reviewed by the Science Review Panel.	2								P								C									
TTA-L1-78 Score Modification	Only the SRP chair (and TTA Group members) is allowed to modify the SRP SCORE. Note it is permissible that other committee members must press the reload button to see the updated score.	2								P								C									
TTA-L1-79 CSR Notification	When the consensus reviews for a given SRP are completed a notification	2								P								C									

ID	Description	#						P/C 7							C 15							
	should be sent to the TTA group.							P							C							
TTA-L1-80 Consensus Review History	History of the changes made during the consensus review need to be tracked.	2						P							C							
TTA-L1-81 Simulate CSR	A TTA Group member shall be able to simulate consensus reviews for testing purposes.	1						C														
TTA-L1-82 Automatic Feasibility Conflict Identification	The software should prevent the assignment of a feasibility reviewer to a proposal for which they are an author.	2		P											C							

TTA-L1-84 Feasibility Review Output	For each Allocation Request the Feasibility reviewer enters COMMENTS FOR THE PI and INTERNAL COMMENTS. The COMMENTS FOR THE PI will be visible to the PI but also to SRP and TAC members. The INTERNAL COMMENTS will only be visible to the SRP, TAC and TTA Group.	3		P													M				C		
TTA-L1-85 Feasbility Review	Feasibility reviews are assessments of each Allocation Request. Technical reviews are assesments technical feasibility and accuracy of the information provided in the technical justification often performed by observatory staff. Data	3		P													M				C		

ID	Description	#															
	Management reviews are are assesments of the feasibility and impact of the processing associated with each allocation request.																
TTA-L1-86 Feasibility PDF Generation Options	The generation of the PDF for feasibility reviews should have the following options: (a) Full proposal. (b) Only the Allocation Request. (c) Only the ALLOCATION ID, PI, TITLE, and TECHNICAL JUSTIFICATION.	1												C			
TTA-L1-87 Simulate Feasibility Review	A TTA Group member shall be able to simulate technical/data management	3	P				P							C			

ID	Description																					
	reviews for testing purposes.																	P				
TTA-L1-88 Store Review Information	For observatory site reviews there shall be a mechanism for a TTA Group member to store review information using the TTA Tools. This shall consist of scientific, technical, and data management components for both internal and PI comments.	3	P														P				C	
TTA-L1-89 Automatic Proposal Conflict Notification	Notification shall be sent to the SRP chair and TTA group members whenever an available or Conflict relation is changed.	2				P											C					

TTA-L1-90 Manual Proposal Conflict Notification	A summary of conflicts status shall be sent to the SRP chair and the TTA group members when all reviewers have either Confilct or Available relation for all proposals assigned to the panel.	2						P										C						
TTA-L1-92 Proposal Review Entry	A reviewer shall be able to enter a review for REVIEW TYPES Primary, Secondary, or Tertiary.	2						P										C						
TTA-L1-93 CSR Initiation	Once all required individual reviews have been completed (including any required technical or data management reviews) and the scores are normalized, the SRP consensus review portion of the Science Review Interface shall be available.	2						P										C						

TTA-L1-94 Reassign Reviewer	In the rare case that a reviewer feels uncomfortable reviewing a proposal they will communicate outside the TTA Tools to a TTA Group member to reassign the review.	2		P													C									
TTA-L1-95 Feasibility Review Inputs	It shall be possible for a reviewer to enter review results either directly through the review interface or via a file import. In either case values shall be validated upon entry: (a) COMMENTS FOR THE PI are variable length strings. (b) INTERNAL COMMENTS are variable length strings.	2				P											C									
TTA-L1-97 Feasibility Review Notification	When each type of feasibility reviews have been completed a notification	2		P													C									

	should be sent to the TTA group.																			C							
TTA-L1-125 Update Score	SRP members may modify their NORMALIZED SCORE and have this reflected in the SRP SCORE.	2							P											C							
TTA-L1-126 Consensus Comments	Two sets of consensus comments are recorded by the committee prior to the conclusion of the SRP Review. The COMMENTS FOR THE PI (which are also visible to TAC members) and the INTERNAL COMMENTS (which are only visible to TAC members).	2							P											C							
04 Allocate																											
TTA-L1-98 Panel Allocate Process	The software shall support a panel based allocation process (informally known as the TAC process).	3																P	M			C					

ID	Description																										
TTA-L1-99 Observatory Site Allocate Process	The software shall support an observatory site allocation process, where the director (or designee) determines the allocation disposition.	1																	C							
TTA-L1-100 Special Solicitation Allocate Process	Special solicitations in support of sponsored time require creation of dispositions by the local schedular. The software shall support this activity.	2																	M					C		
TTA-L1-101 TAC Proposal View	A TAC member shall be able to view or download all proposals. There should be a way to filter by facility (e.g., download only files with an Allocation Request that contains the VLA), and proposal class (e.g., Large proposals).	1																C								

ID	Requirement																						
TTA-L1-102 TAC Proposal Summary View	A TAC member shall be able to view or download summaries of each proposal. The summary should consist of the PROPOSAL ID, NORMALIZED LINEAR-RANK SCORE, SRP NAME, FACILITIES, PRINCIPAL INVESTIGATOR, CO-INVESTIGATORS, TITLE, ABSTRACT, PRELIMINARY PRIORITIES, COMMENTS FOR THE PI, and INTERNAL COMMENTS. There should be a way to organize these by facility and proposal class.	1																		C			
TTA-L1-103 TAC Facility Report View	A TAC member shall be able to view or download the report for each facility which includes the LST (or GST) pressure plot.	3																P	M			C	

ID	Description	#																														
TTA-L1-104 TAC Comments for the PI	A TTA Group member shall be able to enter COMMENTS FOR THE PI, and INTERNAL COMMENTS stemming from the TAC Meeting into the TTA Tools using the UI or by file import.	2											P					C														
TTA-L1-105 Super TAC Meeting Comments	A TTA Group member shall be able to enter COMMENTS FOR THE PI, and INTERNAL COMMENTS stemming from the SUPER TAC Meeting into the TTA Tools using the UI or by file import.	2															M			C										
TTA-L1-107 TAC Testing	For testing purposes there shall be a mechanism to automatically generate Allocation Dispositions for each Allocation Request.	3			P						P					C														

| TTA-L1-108 Create Allocation Disposition | There shall be an interface for a TTA Group member to create an Allocation Disposition. | 1 | | | | | | | | | | | | | | | | | | | | | C | | | | | | |

05 Approve

| TTA-L1-109 Generate CVS Spreadsheet | For each facility a csv-formatted file by shall be generated that lists: ALLOCATION REQUEST ID, PRINCIPAL INVESTIGATOR, NORMALIZED LINEAR-RANK SCORE, REQUESTED TIME, and APPROVED TIME for each SCHEDULING PRIORITY (A, B, C [filler], F [fixed], and N [rejected]). | 3 | | | | | | | P | | | | | | | | M | | | C | | |

										P								M			C		
TTA-L1-110 Generate Metrics	For each facility the following statistics shall be generated: the number of proposals submitted, approved (priority A, B, F), filler (C), rejected (N), and oversubscription (submitted/approved); and by proposal hours: the requested time, the available time, the approved time (priority A, B, F), filler time (C), rejected time (N), and the pressure (requested hours/available hours).	3									P								M			C		
TTA-L1-111 Panel Review Process Allocation Disposition Approval	There shall be a mechanism for a TTA Group member to approve each Allocation Disposition based on results from the Director's Review.	1									M													

TTA-L1-112 Allocation Disposition Testing	For testing purposes there shall be a mechanism to automatically approve each Allocation Disposition. A TTA Group member shall be able to either approve all dispositions or to randomly approve dispositions.	1									C																	
TTA-L1-113 Edit Allocation Disposition	A TTA Group member must be able to alter any Allocation Disposition.	2									P											P						
TTA-L1-114 Director's Review Report	A TTA Group member is responsible for producing a Director's Review report which is based on all proposals, the NORMALIZED LINEAR-RANK SCORE, and the Allocation Dispositions. The TTA Tools shall generate various metrics (tables	4			P						P											M				C		

	and plots), and csv-formatted spreadsheets that will be included with the report.																						
TTA-L1-115 Observatory Site Review Allocation Disposition Approval	There shall be a mechanism for the Director's Delegate to approve each Allocation Disposition.	3			P					M												C	
06 Close																							
TTA-L1-116 Panel Review Process Outputs	The panel review process shall produce a normalized linear rank, and comments both for the PI and internal.	4					P	P									M					C	

ID	Description																									
TTA-L1-117 Observatory Site Review Outputs	The observatory review process shall produce a binary recommendation, comments for the PI, and internal comments.	3		P								P							C							
TTA-L1-118 TAC Report	For a semester solicitation a TTA Group member needs to produce a TAC report which summarizes the results of the TAC recommendations (after any adjustments made by the Director). The TTA Tools shall produce metric statistics (tables and plots) that are required in the TAC report.	2										P												C		
TTA-L1-119 Send Dispositions	A TTA group member shall also be able to send the dispositions either in bulk (e.g., semester solicitations) or one at a time	2										M												C		

											M													C	
	(e.g., DDT solicitations).																								
TTA-L1-120 Observatory Site Review Dispositions	The TTA Tools shall generate a template disposition for the given DDT proposal that can be modified and sent by a TTA Group member.	2									M													C	
TTA-L1-121 Generate Disposition Letter	The TTA Tools shall generate a template disposition letter for each proposal that can be reviewed and modified by a TTA Group member.	2									M													C	
TTA-L1-122 Disposition Template	There shall be a mechanism to generate a template disposition, either for a specified proposal or for all proposals within a semester solicitation.	2									M													C	

ID	Description	Priority							C																
TTA-L1-123 Edit Disposition Text	A TTA Group member shall be able to edit the disposition text.	1							C																
TTA-L1-124 Make Allocation Dispositions Public	There shall be a mechanism for a TTA Group member to make the approved Allocation Dispositions public in the archive. Either for a given proposal or for all proposals within a semester solicitation.	2							M														C		

Science Ready Data Products Requirements

ID	Description	Priority																				P		C
TTA-SRDP-10 Image Product Specification	The paramters of the SRDP products shall be explicitly specified in the observing proposal.	2																					P		C
TTA-SRDP-10.1 Opt out of SRDP Images	Projects shall be able to opt out of SRDP Imaging at the proposal submission stage with a brief description of why SRDP imaging is not	2																					P		C

Requirement	Description	#																												
	appropriate for the project.																												P	C
TTA-SRDP-10.2 Parameterization	Parameters for SRDP products shall specify image characteristics (as opposed to processing instructions).	2																											P	C
TTA-SRDP-10.2.1 Spatial Resolution	The desired spatial resolution shall be specified as part of the observing proposal.	1																											C	
TTA-SRDP-10.2.2 Spectral Resolution	The desired spatial resolution shall be specified as part of the observing proposal.	1																											C	
TTA-SRDP-10.2.3 Multiple Phase Centers	If multiple phase centers are specified, the proposal shall specify if they are to be mosaiced or imaged independently.	1																												C

TTA-SRDP-10.3 Multiple Executions	Combined imaging of multiple executions of the same scheduling block in the same configuration shall be supported.	1																									C	
TTA-SRDP-11 Time Critical Processing	The proposal tool shall allow telescope users to designate projects for time critical processing.	1																									C	
TTA-SRDP-11.1 Critical Product Specification	The proposal submission tool shall allow the telescope user to specify which data products should be treated as time critical: calibrated visibilities, quick-look images, or science-ready images.	1																									C	
TTA-SRDP-11.2 Observing Restrictions	Time critical processing shall conform to standard observing templates, and specify the characteristics of	1																									C	

	the desired imaging products.																									C	
TTA-SRDP-12 Data Management Plan	Large Projects process shall submit a data management plan and data release policy for data products generated during execution of the project in the observing proposal. Description of the data products and approximate size shall be included in all future proposals.	4	P	P																	M					C	
TTA-SRDP-7 Support for Combined Products	The proposal tool shall support the specification of products requiring combined imaging.	1																									C
TTA-SRDP-7.1 Display of related observations.	Observations for combined products should be grouped together.	1																									C

ID	Description			C
TTA-SRDP-7.2 Consistency of observation.	The observing tool shall ensure that the spatial and spectral coordinates of the observation are consistent between the different epochs of observation.	1		C
TTA-SRDP-7.3 Ratio of Observing Times	Total integration times for each configuration shall be set according to observatory determined ratios.	1		C
TTA-SRDP-8 Opt out of SRDP Calibration	The SRDP Proposal process shall allow the user to "opt out" of the standard calibration process, with documentation to justify the decision. Such proposals shall inhibit automatic trigger of the Standard calibration pipeline.	1	C	

	Title: Telescope Time Allocation Tools Execution Plan	Authors: Treacy, Kern	Date: 6/17/2020
	Document No: 688-TTAT-010-MGMT		Version: 2.0

TTA-SRDP-9 Required Information	SRDP compliant proposals shall include adequate information for creation of scheduling blocks and observing scripts.	4														P			M	P	C	

Appendix C: Work Package Effort Estimates

This summary of the labor estimates for each development package is built from estimates of the effort required for each of the seven steps included in each phase.

Development Phases	Project Total	Scientific Staff				Data Management			
		Sub-Total	SSA	NM-Ops	Green Bank Observatory	Sub-Total	Architecture	Science Support and Archive	GBO Software Division
Total	**369.5**	**96.9**	**35.9**	**40.5**	**20.5**	**272.6**	**33.6**	**163.0**	**76.0**
Logical Design and Validation	**32.2**	**6.6**	**4.2**	**1.5**	**0.9**	**25.6**	**3.6**	**13.0**	**9.0**
Phase 2: Observatory Site Review & Disposition	**9.5**	**2.3**	1.4	0.6	0.3	**7.2**	1.2	5.0	1.0
Phase 3: Allocation Approval, Project Creation, Process Closeout	**9.5**	**2.3**	1.4	0.6	0.3	**7.2**	1.2	4.0	2.0
Minimum Viable Product Development	**273.1**	**72.9**	**19.4**	**34.7**	**18.8**	**200.2**	**25.2**	**118.0**	**57.0**
Phase 4: Solicitation Definition	**12.4**	**1.8**	1.2	0.3	0.3	**10.6**	0.6	7.0	3.0

Phase 5: High Level Proposal Entry	**10.2**	**1.6**	1.0	0.3	0.3	**8.6**	0.6	6.0	2.0
Phase 6: Panel Based Review									
Phase 6a: Science and Feasibility Reviews	**11.8**	**1.6**	1.0	0.3	0.3	**10.2**	1.2	7.0	2.0
Phase 6b: Consensus Meeting	**9.8**	**1.6**	1.0	0.3	0.3	**8.2**	1.2	5.0	2.0
Phase 7: Proposal Close Out	**11.8**	**1.2**	0.4	0.4	0.4	**10.6**	0.6	5.0	5.0
Phase 8: Allocation Requests									
Phase 8a: Source Information	**25.9**	**3.5**	0.4	2.8	0.3	**22.4**	2.4	15.0	5.0
Phase 8b: Time Constraints	**11.7**	**3.1**	0.4	1.7	1.0	**8.6**	0.6	6.0	2.0
Phase 9: Global User IDs	**15.0**	**1.8**	1.2	0.3	0.3	**13.2**	1.2	9.0	3.0
Phase 10: Proposal Submission and Vetting	**5.8**	**1.2**	0.8	0.4		**4.6**	0.6	4.0	
Phase 11: Expert Capabilities									
Phase 11a: Solicitation Definition	**36.2**	**14.4**	2.4	7.2	4.8	**21.8**	4.8	11.0	6.0
Phase 11b: Observing Specification	**34.0**	**14.6**	3.2	7.2	4.2	**19.4**	2.4	11.0	6.0
Phase 12: Complete Review Process	**11.9**	**2.3**	1.5	0.4	0.4	**9.6**	0.6	6.0	3.0
Phase 13: TAC Meeting Support									
Phase 13a: Time Allocation Committee Preparation	**34.4**	**15.0**	3.0	8.0	4.0	**19.4**	2.4	10.0	7.0
Phase 13b: TAC Meeting Support	**16.2**	**6.0**	1.5	3.0	1.5	**10.2**	1.2	6.0	3.0
Phase 14: Project Creation	**26.0**	**3.2**	0.4	2.1	0.7	**22.8**	4.8	10.0	8.0

Feature Development	64.2	17.4	12.3	4.3	0.8	46.8	4.8	32.0	10.0
Phase 15: Past Proposal Migration	7.9	1.3	0.9	0.2	0.2	6.6	0.6	4.0	2.0
Phase 16: SRDP Capabiliity Development 1	15.7	6.5	4.5	2.0		9.2	1.2	8.0	
Phase 17: External and Sponsored Proposals	10.6	2.0	1.4	0.3	0.3	8.6	0.6	4.0	4.0
Phase 18: SRDP Capability Development 2	17.2	6.0	4.5	1.5		11.2	1.2	10.0	
Phase 19: Create Proposal from Existing Proposal	12.8	1.6	1.0	0.3	0.3	11.2	1.2	6.0	4.0