Astronomer's Proposal Tools (APT) Phase 1 Project Requirements Document

Maria Bertch
Brett Blacker
Ron Downes
Ray Lucas
Tony Krueger
Harry Payne
Denise Taylor

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1. Background & Goals

A Phase 1 phase A study was conducted during the summer of 2000 with the following goals:

- Develop a better understanding of the Phase 1 process.
- Achieve a more efficient and complete process for loading Phase 1 data into a Sybase database.
- Improve the Phase 1 source data and manner in which the address table in the Assist database is loaded.

This group presented their results in August of 2000. They recommended that the Phase 1 process be incorporated into the APT tool suite. They also presented the STScI operational savings that could be realized by this approach. The full report is available at http://www.stsci.edu/dbsa/doc/phaseone.html. The Phase A study group did not study the impact on the APT user. A Phase 1 APT study was conducted during the fall of 2000 with the following goal:

- Develop a concept of operations and set of requirements that would allow STScI to realize the Phase 1 operational improvements without overburdening the Phase 1 investigators.

This document describes the recommendations and requirements of the Phase 1 APT study group. This is a living document that will be updated throughout the life of the project.

2. Concept of Operations

Investigators will go to the STScI Phase 1 web page as they do today for relevant and pertinent Phase 1 instructions and information. When they are ready to prepare their Phase 1 proposal, they will download the APT tool suite off of the Phase 1 page. Investigators have the following tools available to them when they use APT in Phase 1 mode.

- Visual Target Tuner tool which will provide the investigator with the ability to visualize their targets and field of view.
- Exposure Time Calculator tool which will provide the investigator with the ability to calculate exposure times and count rates.
- Phase 1 Proposal Editing tool which will provide the investigator with the ability to input their phase 1 proposal
- Resource Estimator tool which will calculate the number of orbits required for their observations. This tool will be based on the Phase 1 resource estimation algorithms used today during Phase 1.
- Observatory Constraint Manager tool, which will ensure that the investigator enters legal instrument configurations. This tool is not directly used by the investigator, but will be used by the GUI.
- Submission tool, which will provide the investigator with the ability to submit his proposal to STScI.
- Starview2 tool, which will provide the investigator with the ability to access archived observations and perform duplication checking.

Any specific information that has to be loaded into the Phase 1 STScI database would have to be entered through the Phase 1 Proposal Editing tool and checked for specific formats and syntax. The information they must enter into the Phase 1 proposal Editing tool is the Phase 1 cover page, observation summary form, abstract, and duplication information. Other text information such as the scientific justification and observing information will be written with any tool available to the investigator. They will have to create a postscript or PDF version of the information. APT will provide a means for attaching the file to their Phase 1 submission. After entering their Phase 1 proposal, the PI will submit the information to STScI and be given a unique proposal id. One file containing the entire PI proposal will be submitted to STScI. STScI will post proposal acceptance and receipt information on the Phase 1 web page for investigators to access.

3. Phase 1 Use Case

1. Investigator accesses STScI Phase 1 web page for pertinent information.
2. Investigator downloads APT tool suite via the Phase 1 web page.
3. Investigator collaborates with their Co-Investigators on their proposal. They write their scientific justification and observing information in any editor.
4. Investigator enters required information into APT Phase 1 editor and attaches their scientific justification and observing information.
5. Investigator submits Phase 1 proposal and is given a unique id.
6. STScI posts proposal receipt and acceptance information on the Phase 1 page by unique id.

4. Issues for More Requirements Analysis

This section lists issues that need to be clarified for existing requirements or new issues to be investigated. These issues were raised after the requirements review and need to be resolved before beginning implementation.

1. Brett Blacker to work with developers on the way proposals submitted to the institute are named (ie., unique ids). This is related to requirement R.10. Also how to name things to handle re-submissions.
2. Ray Beaser had requested that the phase 1 software send the coverpage info to the authorizing official at the submitting institution when STScI recieves a phase 1 proposal. Ray said that a large number of PIs don't notify there grant/contracts office or get approval before submitting to STScI and that this notification would help the authorizing agency. The APT user group didn't see the need to do this. STScI should not have to do additional work because a PI is not following there institutions policies. This issue was not resolved. This would be a new requirement.
3. Ray Beaser mentioned that there are some standards being developed for proposal submission based on XML and HTML and that APT should conform to these standards if possible. The following web sites are relevant http://www.fedcommons.gov/, http://www.cfda.gov/federalcommons/, http://www.financenet.gov/iaegc.htm This affects requirements R1 and R22.
4. Need to define how APT will get the address information from STScI. Need to work with DDT to define this and work out responsibilities for supplying the data to APT.

5. System Requirements

Scope

This section describes the system requirements for the Phase 1 part of APT. Assumptions in this document have the following format <A.one-up-number>. Requirements, which must be implemented, have the following format <R.one-up-number>. Requirements, which are not required for the initial system, but would be nice to have at some time in the future, have the following format <NR.one-up-number>.

System Constraints and Assumptions

A.1 The internal STScI proposal submission system will no longer be able to use procmail and should be converted to a new system. This is based on the CISD recommendations for STScI email support. APT may continue to use procmail only if it's considered too costly to convert to a new tool within our schedule constraints.

A.2 APT users have Internet connectivity on the computer where they installed APT.

APT System Requirements

R.1 The system shall provide the following tools to the investigator for Phase 1 use:

- Visual Target Tuner tool which will provide the PI with the ability to visualize their targets and field of view.
- Exposure Time Calculator tool which will provide the PI with the ability to calculate exposure times and count rates.

- Phase 1 Proposal Editing tool, which will provide the PI with the ability to input their phase 1 proposal.
- Observatory Constraint Manager tool, which will ensure that the PI enters legal instrument configurations. This tool is not directly used by the PI, but will be used by the GUI.
- Submission tool, which will provide the PI with the ability to submit their proposal to STScI.
- Starview2 tool, which will provide the investigator with the ability to access archived observations and perform duplication checking.

NR.1 The following tools are not required for Phase 1 support in APT, but are tools which would be nice to have as part of the Phase 1 tool suite.

- Resource Estimator tool which will calculate the number of orbits required for their observations. This tool will be based on the Phase 1 resource estimation algorithms used today during Phase 1.
- Duplication Checking tool which would assist the investigator in checking for target duplication. This is envisioned to be part of the Starview2 support in APT

NR.2 Incorporating part of Phase 2 into Phase 1. To facilitate the quick ingest and processing of ACS and NICMOS proposals in Cycle 11, we would like the option of asking those PIs with "simple" programs to submit an essentially complete Phase II proposal instead of the Phase I Observation Summary. Note that this process, if accepted by the community, could be used in later cycles to reduce the time from submission to execution, as well as speed up creation of the Long Range Plan. The concept would be for the proposer to complete the Phase I proposal as normal, but when submitting the observation information, they would go to a Phase II mode, which would give them the ability to submit complete target and exposure/visit information. The PIs would not be required to complete the textual part of the Phase II program (although if accepted, there should be a software tool to copy the relevant information from the Phase I into the Phase II as presently exists).

For the target information, the PI would need to supply accurate coordinates (more accurate than is required in Phase I), as well as proper motion data; in most cases, the PIs would have the proper motion data, and coordinate measurement in the GSSS frame will be made simple by using the VTT.

For visit information, the PI would need to break their exposures into visits (which in practice they already need to do in submitting a standard Phase I program), and provide visit-level special requirements. We would instruct PIs that if they need to use requirements that are not in a limited set (thus making their program not "simple"), they should submit a standard Phase I proposal.

For exposure information, they would need to provide each exposure separately, instead of merging each visit into one line in the Phase I Observation summary. Note that the PIs must already know the individual exposure information in order to estimate their resource allocation, so we are just asking them to provide us with information they already have. We would again limit the use of (exposure-level) special requirements.

This Phase 2 in Phase 1 mode would only be allowed for simple point-and-shoot programs (e.g. no STIS spectroscopy which needs a target acquisition). There would need to be a way to ingest the Phase 2 data into the Phase I exposure database. For those programs that are accepted for execution, the PI would need to tweak the program based on TAC comments, and possibly provide some textual details. In some cases, the programs could be taken as submitted and processed for execution without going back to the PI.

The following is the minimal set of Phase 2 information that shall be supplied in addition to the Phase 1 input data. This input shall be input via the Phase 2 visit, target, and exposure spreadsheet editors.

Target Information:

- Target Number
- Target Description
- Target Flux
- Target Comments
- Alt Target Names
- Equinox
- Coordinate Source
- Radial Vel or Redshift
- RA/DEC PM
- Epoch
- Annual Parallax
- GSSS Plate Id
- RA/DEC only for Fixed Targets - No positional offsets or region of the sky
- NO Moving target or Generic Target information

Visit Information:

- Visit Number
- Orient SR
- After SR
- Before SR
- Between SR
- Sched SR

Exposure Information:

- Exposure Number
- Target Name
- Some Optional Parameters – TBD
- Number of Iterations
- Time Per Exposure
- Pos Targ
- Same Pos As

- Seq Non-Int

In this mode only syntax checking is performed. The user shall not be required to run the Orbit Planner or Visit Planner Tools. If their proposal is accepted, STScI will check the proposal for feasibility and schedualibility.

The system shall have the ability to generate a Phase 2 "prop" file to be included in the XML Phase 1 submission file. A STScI tool is required to extract the Phase 2 information out of the XML file for Phase 2 use and the Phase 1 information for phase 1 database population.

R.2 The Phase 1 Proposal Editing tool shall provide the user with an Address Spreadsheet Editor for entering address information. This tool shall be laid out similarly to an excel spreadsheet with similar editing capabilities. All fields shall be checked for validity upon entry. The user shall enter the following information in this editor.

- Honorific
    - 10 characters max – user select from list of options or input
    - phase 2 PI and CoI
    - phase 1 PI
- Last Name
    - 30 characters max – user input
    - phase 2 PI and CoI
    - phase 1 PI
- First Name
    - 20 characters max – user input
    - phase 2 PI and CoI
    - phase 1 PI
- Middle Name
    - 20 characters max – user input
    - phase 2 PI and CoI
    - phase 1 PI
- Sundries
    - TBD – user input
    - Phase 1 PI
- Suffix
    - 10 characters max – user select from list of options or input
    - phase 2 PI and CoI

    - phase 1 PI
- Institute
    - 60 characters max - user select from list of options or input
    - phase 2 PI and CoI
    - phase 1 PI
- Street address
    - 150 characters max – user input
    - phase 1 PI
- City
    - 30 characters max – user input
    - phase 1 PI
- State
    - 20 characters max – user select from list of options or input
    - phase 1 PI and CoI
- Country
    - 20 characters max – user select from list of options or input
    - phase 1 PI and CoI
- Postal Code
    - 15 characters max – user input
    - phase 1 PI
- Phone
    - 20 characters max – user input
    - phase 1 PI
- Email
    - 60 characters max – user input
    - phase 1 PI and CoI
- Admin PI
    - Boolean – user input
    - Phase 1 CoI
- Address flags
    - Booleans - user input (esa-member, etc)
    - Phase 1 PI and CoI
    - Phase 2 CoI

For submissions we have two different users, the PI and the CoI. Not all of this information is needed for both the PI and CoI. This editor will need to be configurable to support PI address entry and CoI address entry.

R.2.1 PIs need to supply their Institution's Proposal ID number at the time the proposal is submitted. This number would then be printed on the notification letter or other correspondence that concerns that proposal. It should not be a mandatory field, but should be about 40 characters in length. These ids are supplied from Grants?

R.3 When entering address information, the system shall require that the last name be entered before any other address information. The system shall use the last name to lookup the investigator in the STScI address table. The system shall provide the user with a list of possible address records if more than one investigator is found. After the investigator selects the appropriate record, they shall be able to update it in the Address Spreadsheet editor. If this is a first time proposer, or the address information is inaccessible, the investigator shall be able to enter the information directly into the Address Spreadsheet Editor.

R.4 The Phase 1 Proposal Editing tool shall provide the user with an Observation Spreadsheet Editor for entering the observation summary information. All fields shall be checked for validity upon entry.

R.5 The Phase 1 Proposal Editing tool shall provide the user with a Text Editor for inputting free text, such as the abstract and duplication information.

R.6 The Phase 1 Proposal Editing tool shall provide the user with a General Information Editor Tool to input cover page information.

R.7 The Address Spreadsheet Editor, Observation Spreadsheet Editor, General Information Editor, and Text Editor shall be incorporated into the APT Top Level GUI and have the same look and feel as the Phase 2 APT tool suite.

R.8 The system shall provide observation constraint checking with the Observatory Constraint Manager Tool.

R.9 The system shall be bundled with Starview2. APT duplication checking will be supported by Starview2.

NR.3 The system shall provide Resource Estimator tool to calculate the number of orbits needed for an observation. This will be based upon the Phase 1 resource estimator.

R.10 The system shall send an XML file to STScI, which contains the entire Phase 1 proposal, both the inputted information via the APT Phase 1 Proposal Editing Tool and the attached binary containing the scientific justification and observing questions. The XML file shall be a unique filename for identifying the proposal. The filename should have the following format. <hst_cycleXX_uniqueid>, where XX is the cycle number and uniqueid is a unique proposal id generated by APT.

R.11 The system shall perform data compression on the XML file prior to transmission to reduce the size of the proposal submission file. Postscript files can be come quite voluminous with figures and pictures.

R.12 The system shall allow the user to print all of the information they entered into the Phase 1 Proposal Editing tool. The system does not need to be able to print any attached binaries supplied by the PI that were created with a non-APT editor.

R.13 Any Phase 1 attachments provided by the user shall be in PDF or Postscript format.

NR.4 The system shall allow Phase 1 attachments in Microsoft Word format.

R.14 The system shall generate the unique proposal id described in R.10 and provide this to the user at proposal submission time. The system shall write the XML submission file to local disk at submission. This id will be used to look up information on the state of the proposal on the STScI Phase 1 web page.

R.15 The Phase 1 STScI web page shall provide the user with state information about their proposal. At a minimum, the following information should be provided to the investigators on the Phase 1 web page.

- Proposal Id – Id generated at submission time
- Scientific Category – Scientific category of the proposal
- Submission Source
- Status – TBD, but tells if the proposal was received at STScI and if it could be successfully printed.
- Comments – Comment field

R.16 The table in Appendix A describes which data will be entered during the Phase 1 process and in which editor. This table does not breakout all of the pieces of an Address. The address fields are listed in R.2.

R.17 If an investigator in unable to use APT, STScI will provide them with the Latex Phase 1 form for submission. The investigator will fill out the latex form and email their submission to STScI. We envision this as a contingency plan for the first release of the APT Phase 1 system.

R.18 The system shall be able to save and reload a proposal. This will allow an investigator to work on the proposal over a non-contiguous period of time. The system will need to save whatever state and data required to restart the system.

STScI System Requirements

R.19 All related Phase 1 files shall be stored under the unique proposal id supplied to the investigator at submission time.

R.20 The STScI system shall no longer use procmail. An alternative tool shall be implemented.

R.21 The STScI system shall provide a tool for uncompressing the submitted Phase 1 XML file.

R.22 The STScI system shall provide a tool which will replace the Parse Phase 1 tool which converts the existing Phase 1 Latex forms to text for STScI processing. The new tool will convert the APT Phase 1 XML submission to text. The text output format will be the same format that is generated from the Parse Phase 1 tool today. Using the same format will keep the in-house process the same.

Performance Requirements

R.23 After receipt of the Phase 1 Proposal, the STScI phase 1 web page will be updated within 2 hours to tell the user that the proposal was received.

R.24 After receipt of the Phase 1 Proposal, the STScI phase 1 web page will be updated within 2 working days to tell the user if the proposal's attachments were acceptable. Currently this is done with the PS Acknowledge tool. Need to replacement for this tool.

Internet and Email Connection Requirements

R.25 The system shall have the ability to connect to the Internet to access archives, catalogs, and STScI.

R.26 The system shall have the ability to send Phase 1 proposal information via the internet to STScI.

Hardware and Software System Requirements

R.27 The system shall run on Sun Microsystems Ultra 1 machines or better.

R.28 The system shall run under 2.6 or later Unix operating system on Sun Microsystems Machines.

R.29 The system shall run on PC machine with 400Megahertz processors or better.

R.30 The system shall run under the latest version of Windows NT 4.0 and Windows 2000 operating system. The system shall provide an unsupported version that will run on Linux and Mac/OSX.

R.31 The system shall be available for download from the STScI web pages.

R.32 The system shall run under Java 1.3 or later version.

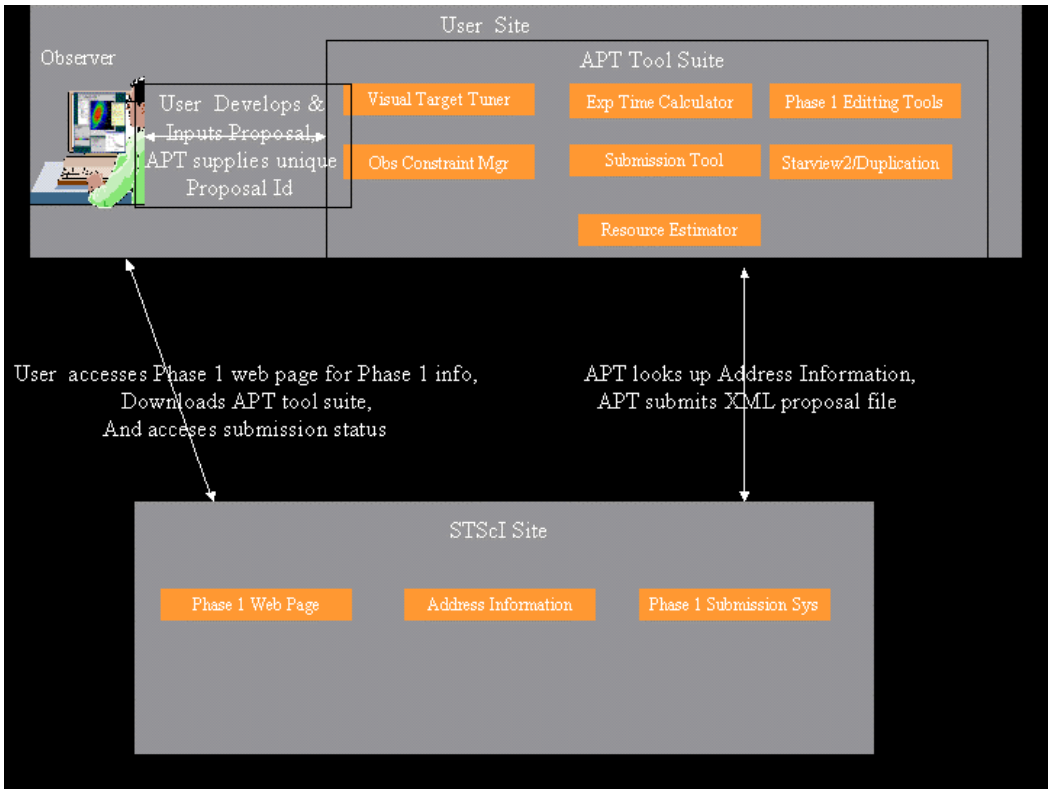
Security Requirements

R.33 All systems running at STScI (servers, databases, URL addresses, etc) to support APT must be accessible outside of the STScI firewall.

R.34 There are no data security requirements for the Phase 1 Proposal. The proposal does not need to be encrypted during transmission to STScI.

6. Data Process Flow

Figure 1 illustrates the data flow between the user, the APT tool suite, and STScI. This figure also illustrates which tools are located at the user site and which are located at STScI.



Phase 1 Data Flow Diagram

Figure 1.0

7. Resource Estimates

The following table provides FTE estimates for the tasks needed to support the Phase 1 Tool requirements. These estimates are NOT calendar time, but the amount of time to complete the task. Calendar time estimates will depend on who is doing the work. These estimates are based on experienced developer's doing the work (Frank Tanner or Rob Douglas). The task column describes the task to be performed. The Effort column describes whether the task is a task that will be done as part of the APT project or whether the task is Phase 1 specific only. If the work is going to be done as part of the APT project, man months are not provided since this effort was already budgeted for by the project. The Man Months column provides an estimate of the amount of effort from requirements clarification to deploying the task. The requirements Map column maps the requirements to the task.

Task	Effort	FTE Weeks	Requirements Map
Top Level APT GUI for supporting APT tools and editors.	APT Project	Not Provided	R.1, R.7
Observatory Constraint Manager	APT Project	Not Provided	R.1, R.8

VTT	APT Project	Not Provided	R.1
ETC	APT Project	Not Provided	R.1
Starview2	APT Project	Not Provided	R.1, NR.2, R.9
Platform Support	APT Project	Not Provided	R.26, R.27, R.28, R.29, R.30, R.31, R.32
Security Support	APT Project	Not Provided	R.33, R.34
Saving / Reloading Phase 1 Proposal	Phase 1 Tool	1	R.18
Extending APT data model to support Phase 1 Fields	Phase 1 Tool	2	No Explicit User Requirement
APT Generic Spreadsheet Tool	Phase 1 Tool	4	R.4, NR.2
APT Phase 1 General Information Editor	Phase 1 Tool	2	R.6, R.16
APT Observation Spreadsheet Editor	Phase 1 Tool	2	R.4
APT Text Input Editor	Phase 1 Tool	2	R.5, R.16
APT Address Editor	Phase 1 Tool	4	R.2. R.3, R.16
APT Submission Tool	Phase 1 Tool	8	R.10, R.11, R.13, NR.4, R.10
APT Phase 1 Printing	Phase 1 Tool	1	R.12
APT Required FTE Total		**26**	
STScI Phase 1 web Page	Phase 1 Tool	2	R.15, R.23, R.24
STScI Submission Tool	Phase 1 Tool	3	R.19, R.20, R.21, R.22
STScI Latex Support	Phase 1 Tool	1	R.17
STScI Address Access	Phase 1 Tool	1	R.3
STScI Required FTE Total		**7**	
Resource Estimator Tool	Phase 1 Tool	8	NR.1, NR.3
Phase 2 to Phase 1 Conversion Tool	Phase 1 Tool	2	NR.2
Extending APT data model to support Phase 2 Fields	Phase 1 Tool	2	NR.2
Visit, Target, Exposure Spreadsheet Editors	Phase 1 Tool	5	NR.2
Project Optional FTE Total		**17**	
Project Required FTE Total		**33**	

8. Deployment Schedule and Development Support Plan

It is recognized that there are no personnel resources available at this time to develop this system for a June 2001 release. If resources can be made available, we would like to see an APT Phase 1 system available for June 2001 (cycle 11). Our expect delivery date is June 2002 (cycle 12). The following table describes the current APT Phase 1 support plan and alternate plans that we

could pursue to reduce risk. We don't need to make a decision on this until Summer of 2001. If we add additional support from outside the APT project, there may be additional spin-up time needed.

APT Phase 1 Support Plans	Work Time Frame	Level of Effort	Risk
- Rob and Gary do the work under expected work schedule. - Current Support Plan	January 2002 – June 2002	No Additional resources needed	- can support June 2002 release - tight schedule - HIGHEST RISK
- Rob and Gary do the work under worst case schedule. - Current Support Plan	March 2002 – June 2002	No Additional resources needed	- Can't support June 2002 release
- Rob and Gary do part of the work. - Additional Support implements - Address Editor Tool - Submission tool - Alternate Plan (Risk Mgt)	- Gary and Rob available in Jan or March 2002 to June 2002 - Additional resources can start now.	Additional STScI software resources from current staff - 6 FTE wks for Address - 9 FTE wks for Submission	- Can support June 2002 release - MEDIUM RISK - Assigning additional resources as early as possible will help reduce the risk of project spin-up affecting the schedule.
- Rob and Gary do part of the work. - Holly Abraham does majority of the work - Alternate Plan (Risk Mgt)	- Gary and Rob available in Jan or March 2002 - Holly from Oct 2001 – June 2002.	Holly hired for FY02. Monies not in ESS budget.	- Can support June 2002 release - Holly new employee. May not want to renew her as employee. To early to tell. - LOWEST RISK

9. State of the Work

The following table describes the state of the work as of January 14, 2002.

Requirement/Assumption	Comments
A.1, R.20	We are still looking at replacing procmail with another mechanism, but this is driven by CISD's interest not the project. TBD
A.2	Done
R.1	VTT, ACS ETC, OCM, & SV2 available now. Prototype Phase 1 editting tool available now. Submission tool still to be done
NR.1	Resource Calculator not in plan currently. Duplication checking available with Starview 2.
NR.2	Believe its available today. A PI can switch between Phase 2 and Phase 1 mode in APT. All the tools are available if they choose to use them. We have no restrictions on what they choose to use during Phase 1.
R.2, R.3	Preliminary GUI available. Need to work with DDT to define how to get the information from an STScI server. Need to define

	responsibilities maintaining/updating the data on the server side.
R.2.1	TBD. Need information from Contracts on how to do this.
R.4, R.5, R.6, R.7, R.8, R.9,	Preliminary versions available now.
NR.3	Not on Schedule currently
R.10, R.14, R.19	Related to Issue 1. Mechanism needs to be defined.
R.11	TBD
R.12	Preliminary version available for viewing the data textually. Printing TBD.
R.13	TBD
NR.4	TBD if not much work.
R.15, R.16	TBD
R.17	Done. Needs to be updated for Cycle 12
R.18	Preliminary versions available now
R.21	TBD
R.22	TBD, need output format from SPSO
R.23, R.24	TBD
R.25	Done
R.26	TBD
R.27, R.28, R.29, R.30, R.31, R.32	Done
R.33	TBD
R.34	Done

Appendix A

The following table describes which data is entered into which editors. This table shows both the Phase 2 and Phase 1 editing tools. Grayed Columns are relevant to Phase 1. The following key is used to describe the values in the column

- I in a field means that a user will enter the information into the editor
- D in a field means that the editor will display the information only
- A in a field means that the editor will allow the information to be attached.
- U in a field means that the editor will use the information only

	Field	Gen Info Ed	Adres Sheet Ed	Obs Sum Ed	FT Sheet Ed	MT Sheet Ed	GT Sheet Ed	FT Pos Ed	Mt Pos Ed	GT Pos Ed	Flux Ed	MT Wind Ed	Txt Input Ed	Vis Sheet Ed	Spec Req Ed	Pat Sheet Ed	Pat Explo der	Exp Sheet Ed	Op Parm Ed	Hier Prop Ed

	Applicable Phase	P1 P2	P1 P2	P1	P2	P2	P2	P2	P2	P2	P2	P2	P1 P2	P2	P2	P2	P2	P2	P2	P2
	Title	I																		
	Proposal Category	I																		
	Scientific Category	I																		
	Science Keywords	I																		
	Submission Mode	I																		
	PS Contact		I																	
	PI Name		I																	
	PI Institution		I																	
	PI Address		I																	
	PI Telephone		I																	
	PI email		I																	
	PI ESA member		I																	
G	Proposing Cycle	I																		
E	Requested Orbits			I																
N	Parallel Requested Orbits			I																
E	Allocated Orbits																			
R	Requested Orbits Next Cycle	I																		
A	Parallel Requested Orbits Next Cycle	I																		
L	Requested Orbits After Next Cycle	I																		
	Parallel Requested Orbits After Next Cycle	I																		
I	SnapTargets	I																		
N	Total Budget Request	I																		

FORMATION																				
	Proprietary Period	I																		
	Abstract	D												I						
	CoI Name		I																	
	CoI Institution		I																	
	CoI Address		I																	
	CoI Country or State		I																	
	CoI Email		I																	
	CoI Contact		I																	
	Admin PI		I																	
	CoI ESA member		I																	
	Special Proposal Flags	I																		
	Observation Flags			I																
	Scientific Justification	A																		
	Real Time Justification	A																		
	Observing Description	A																		
	Coordinated Obs Descrip	A																		
	Justify Duplications	D												I						
	Data Analysis Plans	A																		
	Budget Narrative	A																		
	Previous HST programs	D												I						
	Calibration Justification	A																		
	Additional Comments	A																		
	Parallel Pointing Tol	I																		

	Target Number				I	I	I													I
	Target Name			I	I	I	I												D	I
	Target Description				I		I													
	Target Flux (includes vmag for P1)				D	D	D				I									
	Target Comments				D	D	D						I							
	Alt Target Names				I															
T	Equinox				I															
A	Coord Source				I															
R	Rad Vel or Redshift				I															
G	RA/DEC PM				I															
E	Epoch				I															
T	Annual Parallax				I															
	GSSS Plate ID				I															
I	RA /DEC			I	D			I												
N	Target Offsets				D			I												
F	SV2 Search radius																			
O	Sky Reqion Targets				D			I												
R	Level-1					D			I											
M	Level-2					D			I											
A	Level-3					D			I											
T	Window(s)					D						I								
I	Ephem Uncertainty					I														
O	Acq Uncertainty					I														
N	Generic Target Specifications						D			I										
	Pattern Number																I	U	D	I/U

P	Prime Pattern Type															I	U			U/D
A	Prime Pattern Purpose															I	U			
T	Prime Num of Points															I	U			
T	Prime Point Spacing															I	U			
E	Prime Coordinate Frame															I	U			
R	Prime Pattern Orient															I	U			
N	Prime Center pattern															I	U			
	Secondary Pattern Type															I	U			I/D
I	Secondary Pattern Purpose															I	U			
N	Secondary Num of Points															I	U			
F	Secondary Point Spacing															I	U			
O	Secondary Coordinate Frame															I	U			
	Secondary Pattern Orient															I	U			
	Secondary Center pattern															I	U			
	Visit Number													I				D	D	I
	Visit Priority													I						
	PCS Mode													D	I					
	Guiding Tolerance													D	I					
V	Drop to Gyro													D	I					
I	Orient													D	I					
S	Orient from													D	I					

I	Orient from nominal													D	I					
T	Same Orient													D	I					
	CVZ			I										D	I					
I	After													D	I					
N	After By													D	I					
F	Before													D	I					
O	Between													D	I					
R	Group Within													D	I					
M	Period													D	I					
A	Seq within													D	I					
T	On Hold [for]													D	I					
I	Sched													D	I					
O	PAR													D	I					
N	On hold comments												I	D						
	Vist comment												I	D						
	Exposure Number														D			I	D	I
	Target Name Pointer													I				I		I
	Configuration			I											D			I	D	
	Opmode			I														I	D	
	Orbits Per Exposure			I																
	Aperture Flag Coron			I																
E	Aperture			I														I		
X	Spectral Elements			I														I		
P	wavelength																	I		
O	Optional Parameters																	D	I	
S	Number of iterations																	I		
U	Time per exposure																	I		
R	Signal to Noise																	D		
E	Pos Targ														I			D		
	Same Pos As														I			D		

	Pattern Pointer														I			D		
	Par with														I			D		
I	Saa Contour														I			D		
N	Rt analysis														I			D		
F	Req uplink														I			D		
O	Req ephem correction														I			D		
R	Low sky			I											I			D		
M	No split														I			D		
A	Phase														I			D		
T	Seq non-int														I			D		
I	shadow			I											I			D		
O	GS acq scenario														I			D		
N	Same alignment														I			D		
	New alignment														I			D		
	New obset full acq														I			D		
	Same obset														I			D		
	Use offset														I			D		
	Save offset														I			D		
	Exp pcs mode														I			D		
	Same guide star														I			D		
	Obset id														I			D		
	New obset														I			D		
	Exposure Comments													I						