

APT GUI and Architecture Review

Dec 19, 2000

Introduction

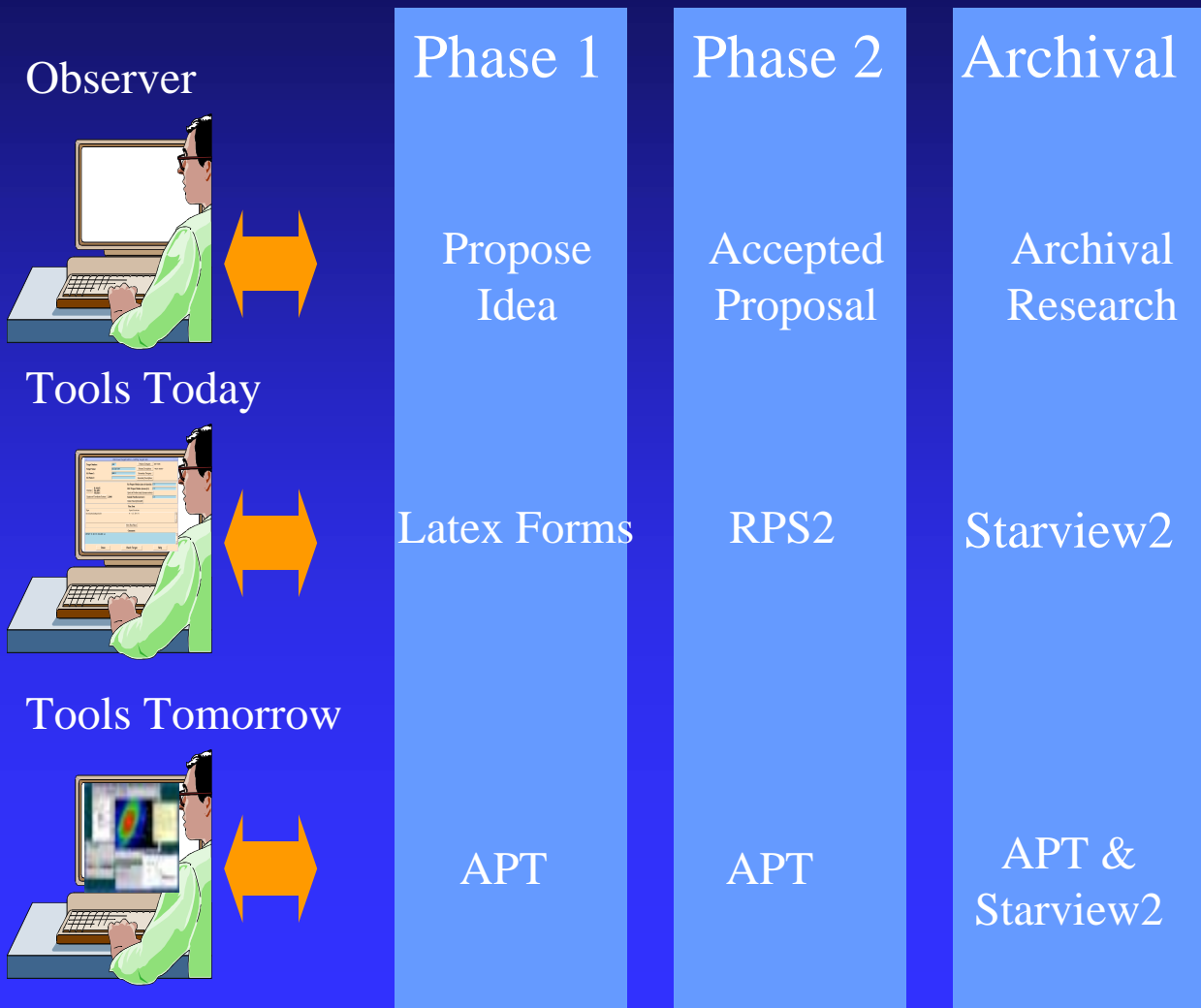
- ❖ Technical review of top level APT GUI and architecture
- ❖ Status review of project in January
- ❖ APT subgroup has met frequently
 - Developed APT concepts
 - Developed use cases and user scenarios
 - Developed initial requirements

Agenda

- ❖ Concept of Operations (10 min – Steve Lubow)
- ❖ GUI and user scenarios (30 min – Steve Lubow)
- ❖ Requirements (20 min – Ed Hopkins)
- ❖ Architecture (20 min – Tony Krueger)
- ❖ Plans (5 min – Tony Krueger)

Concept of Operations

Stages & Tools



APT Goals

- ❖ Provide PIs with an Integrated Observatory Tool
 - Incorporate Phase 1 Support
 - Incorporate Phase 2 Support
 - Incorporate Archival Research Support
- ❖ Replace current Phase 2 tool (RPS2)
- ❖ Build upon SEA prototype to make an HST operational tool
- ❖ Provide PIs with prototype tools as soon as possible
- ❖ Provide more intuitive & easier to use support tools
- ❖ Provide sharable software for use by other observatories

APT Users

- ❖ GOs
- ❖ GTOs
- ❖ Program coordinators
- ❖ Instrument scientists

APT Capabilities

- ❖ Phase 2 users can begin with partially specified Phase 2, based on Phase 1
- ❖ Users can migrate proposals from existing system to APT
- ❖ Users can run a suite of tools that share information
- ❖ Users can explore options with visual tools
- ❖ Users can create, delete, and modify proposal objects (targets, visits, exposures...) through tabular or graphical tools
- ❖ Users can check and submit proposals

APT Technical Components

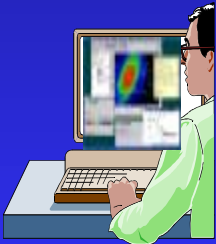
Phase 1 Support

Phase 1 Proposal Editor
Duplication Checker Tool (Starview2)
Resource Estimator Tool

Phase 2 Support

Phase 2 Program Editor
Orbit Planner Tool (TransVerse)
Visit Planner Tool (Spike)
Bright Object Tool
RPS2 File Conversion Tool
Guide Star Tool

Observer



Generic Support

Visual Target Tuner Tool
Exposure Time Calculator Tool
Global Check Tool
Submission Tool
Observatory Constraint Manager Tool
Archival Research Tool (Starview2)
Top Level GUI & Architecture

Phase 1 GO Use Case

- ❖ GO downloads latest version of APT from web
- ❖ GO creates Phase 1 Proposal
- ❖ GO uses tools to define and refine proposal specifications
- ❖ GO runs Global Checking tool and corrects problems
- ❖ GO saves proposal and emails it (XML) to collaborators
- ❖ Collaborators and GO refine proposal
- ❖ GO finalizes proposal, runs Global Checker and Submission Tool

Phase 2 GO Use Case

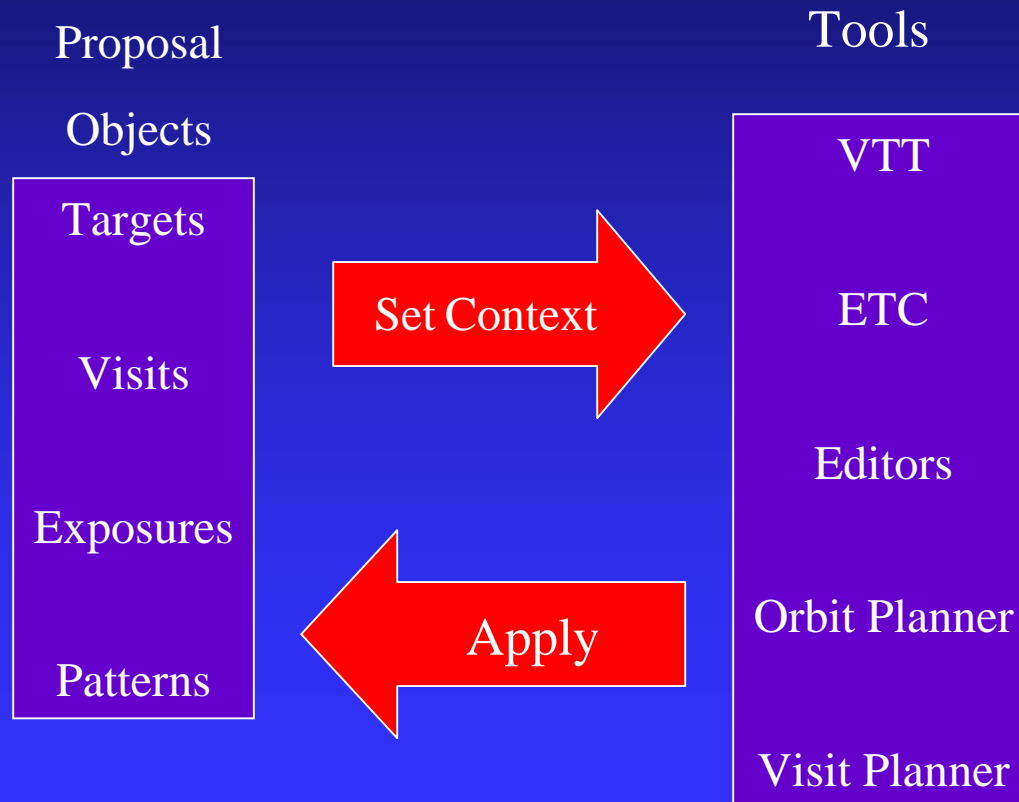
- ❖ GO downloads latest version of APT from web
- ❖ GO obtains Phase 2 info, converted from Phase 1 proposal
- ❖ GO uses tools to define and refine proposal specifications
- ❖ GO runs Global Checking tool and corrects problems
- ❖ GO saves proposal and emails it (XML) to collaborators
- ❖ Collaborators and GO refine proposal
- ❖ GO finalizes proposal, runs Global Checker and Submission Tool

GUI and User Scenarios

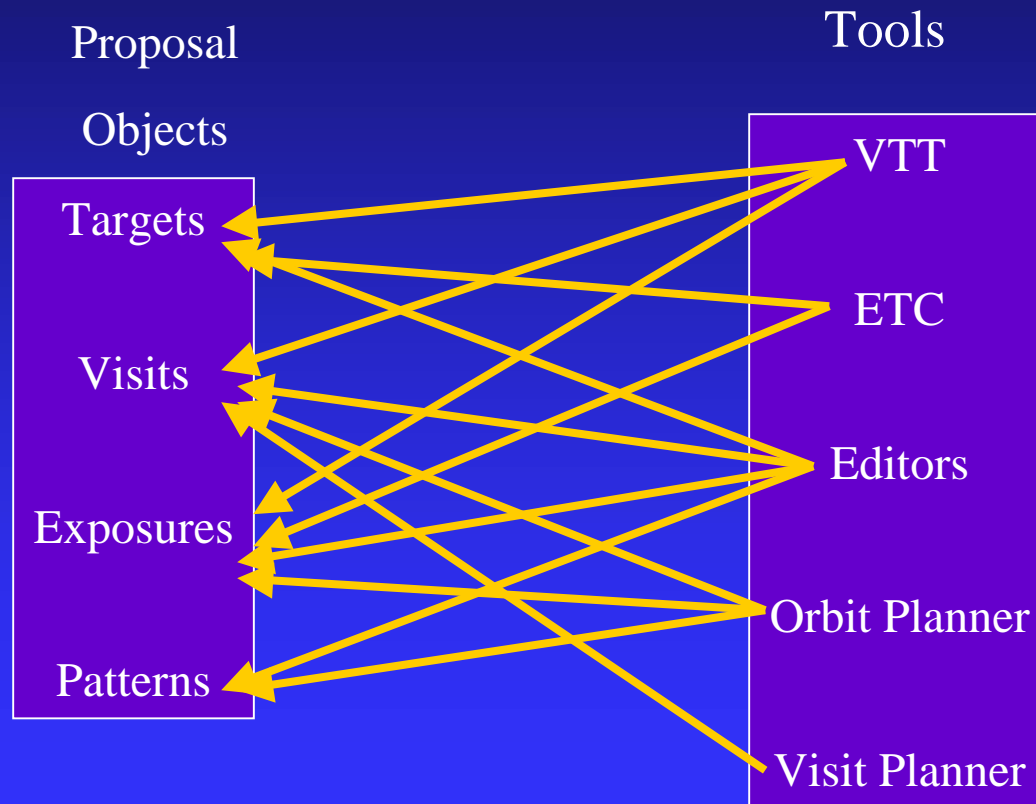
GUI Concepts

- ❖ APT provides an integrated environment for tools and for data sharing among tools
 - ❖ Phase 1 proposal objects: observations
 - ❖ Phase 2 proposal objects: targets, visits, exposures, and patterns. Get filled in as tools are run
 - ❖ Apply operation: Users apply results of tools to proposal objects
 - ❖ Set Context operation: Users select proposal object(s) to provide input (context) to a tool
- > Above 2 points are nontrivial because mapping between proposal objects and tools is many-to-many*

Set Context and Apply in Phase 2



Many-to-Many for Apply



GUI Concepts Continued

- ❖ Spreadsheets provide complete tabular editable view of all proposal objects and templates
- ❖ Visual Tools
- ❖ Batch Tools
- ❖ Users can view and edit proposal structure in Proposal Browser
- ❖ Users can save info from tool into templates - not in proposal. Users can apply templates to proposal objects.

APT Phase 2 GUI

Astronomer's Proposal Tools

File Edit View Help Phase Apply

VTT ETC

- Proposals
 - Proposal 8001
 - Proposal 8321
 - Description
 - Targets
 - Targ 1 NGC4151
 - <new target>
 - Patterns
 - Visits
 - Visit 1
 - Exp 1 (NGC4151)
 - Exp 2 (NGC4151, Pattern 1)
 - Exp 3 (NGC4151)
 - <new exposure>
 - <new visit>
- Template Library
 - Target Templates
 - Pattern Templates
 - Visit Templates
 - Exposure Templates
 - VTT Observation Templates
 - ETC Observation Templates

Exposure Time Calculator – Target1 exp1

File Edit ETC Window Help

Target Tuner [1.OX]

File Edit TargetSelect ImageTools Catalogs Observations Window Help

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Orientation...

535.0, 583.0 6737 12 10 31.94, +39 25 50.99

Input Graph

18000

666 Online

Submit

Global Checker

Visit Planner

Orbit Planner

Editor

Submit

Prop	Visit	Exp	Target	Config	ACS/w/FC	ACS/w/FC	ACCUM	w/FC1	w/FC1	Aperture	Sp_Eleme...	Wavel...	Op Parm	Iterati...	Exp Time	Spec Req	Comments
8321	1	1	NGC4151		ACS/w/FC	ACCUM	w/FC1	F775w	F892N					1	305		Expected S/N=200
8321	1	2	NGC4151		ACS/w/FC	ACCUM	w/FC1	F892N	CR-SPLIT=...				CR-SPLIT=...	1	2005	Pattern 1 2	

GUI Elements

- ❖ Main Menu Bar
- ❖ Tool Bar
- ❖ Proposal Browser
- ❖ Mini-spreadsheet
- ❖ Tool Workspace

Getting Started

- ❖ Users can select Phase 1 or Phase 2 and switch
- ❖ Users can import and save proposal data
- ❖ Users can save and restore sessions
- ❖ Online help for
 - APT help
 - Tool help
 - HST help
 - Directed examples

Navigating Proposal

- ❖ Users navigate through proposal via the Proposal Browser (PB)
- ❖ Users see proposal structure in PB (more than 1 proposal can be displayed)
- ❖ Users create and delete proposal objects in PB
- ❖ Users select context for running tools in PB
- ❖ Users work on templates in PB
- ❖ Users view details of PB objects in mini-spreadsheet
- ❖ Users get proposal object and template action list in PB

Running Tools

- ❖ Users select context in PB
- ❖ Users select tools through tool bar
- ❖ Users can change context anytime
- ❖ Users save results from visual tools to proposal through Apply
- ❖ Users are informed of any options, problems, or conflicts when Apply is selected
- ❖ User can save results to templates
- ❖ Users can display multiple tools, but only 1 is active
- ❖ No more than 1 instance of a tool can be displayed

Submitting Proposal

- ❖ Users must run Global Check tool before submission
- ❖ Global Check tool generates graphical report
- ❖ Phase 1 check: Consistency and completeness
- ❖ Phase 2 checks
 - Consistency and completeness
 - Schedulability
 - Guide Star availability
 - Feasibility
 - Bright Objects
- ❖ Submission tool

User Scenario 1:

Start from proposal object

- ❖ Select proposal object - exposure (context)
- ❖ Select VTT as tool
- ❖ Operate on exposure in VTT
- ❖ Apply results to exposure

User Scenario 2: Start from tool

- ❖ Select VTT as tool
- ❖ Create observation in VTT
- ❖ Apply results to proposal
- ❖ Within Apply: Select proposal object

User Scenario 3:

Start from tool and use templates

- ❖ Select VTT as tool
- ❖ Create observation in VTT
- ❖ Apply results as template
- ❖ Copy template to exposures

APT Requirements

The Requirements Document

- ❖ Aiming to capture the important things that need to be preserved as well as the detailed requirements
 - Goals
 - Scenarios
 - Very high level requirements
- ❖ Aiming for
 - completeness
 - brevity
 - ❖ Lean and mean documents are easier to maintain

Outline of the Document

- ❖ Guiding Principles
- ❖ User Scenarios
- ❖ Detailed Requirements
 - Graphical User Interface Requirements/design
 - Tools by category
 - System Requirements
 - ❖ Hardware, software, security, operational
 - The Global Data Model
 - Performance

APT Guiding Principles

- ❖ Principles that guide the requirement refinement process
- ❖ Principles that are to be taken seriously
- ❖ Some of the principles are not testable in any easy way
- ❖ Some of the principles are things we will only approach asymptotically.
 - We get as close as possible
- ❖ Document “traces” the principle to particular aspects or more general aspects of the detailed requirements

Overview of the guiding principles

- ❖ APT provides a state of the art user interface
- ❖ APT has the same look and feel as other STScI tools
- ❖ APT is an improvement over existing tools
- ❖ The APT tools are integrated
- ❖ The APT tools share a set of common properties
- ❖ The APT tools of the same kind share properties
- ❖ APT are designed to support other missions

Major System Requirements

- ❖ APT supports Phase 1 & Phase 2 proposal development
- ❖ The STScI in-house system remains the same
 - APT submits a RPS2 “.prop” file
- ❖ APT & RPS2 can import each others data via files.
- ❖ APT requires an internet connection (constraint)
 - Some APT tools can run without a connection.
- ❖ Graphical Tools are integrated into APT as GUI “plug-ins”
- ❖ APT allows a user to process their entire proposal in batch mode (Phase 2 only)
 - User doesn't have to process a visit or exposure at a time

Platform & Security Requirements

- ❖ APT runs on Sun Microsystems Ultra 1 or better
 - On 2.6 or later Unix Operating System
- ❖ APT runs on PC machines
 - 400 megahertz or better
 - Supports Windows NT & Windows 2000 operating system
- ❖ There are no data security requirements
- ❖ All STScI Servers are hosted outside the firewall

Major Performance Requirements

- ❖ APT running in Phase 2 batch mode processes a proposal in 10 minutes or less on average.
- ❖ The visit planner (Spike) processes an entire proposal in 2 minutes or less on average.
 - Doesn't include network latency.
- ❖ The Orbit planner (TransVerse) processes a request for service on an exposure in 7 seconds or less on average.
 - Doesn't include network latency

Major Requirements being Scoped

❖ APT Help Support

- Phase 1 & Phase 2 instructions
- Instrument Handbooks
- Tool Help
- Working Group Formed -> recommendation April 2001

❖ APT Moving Target Support

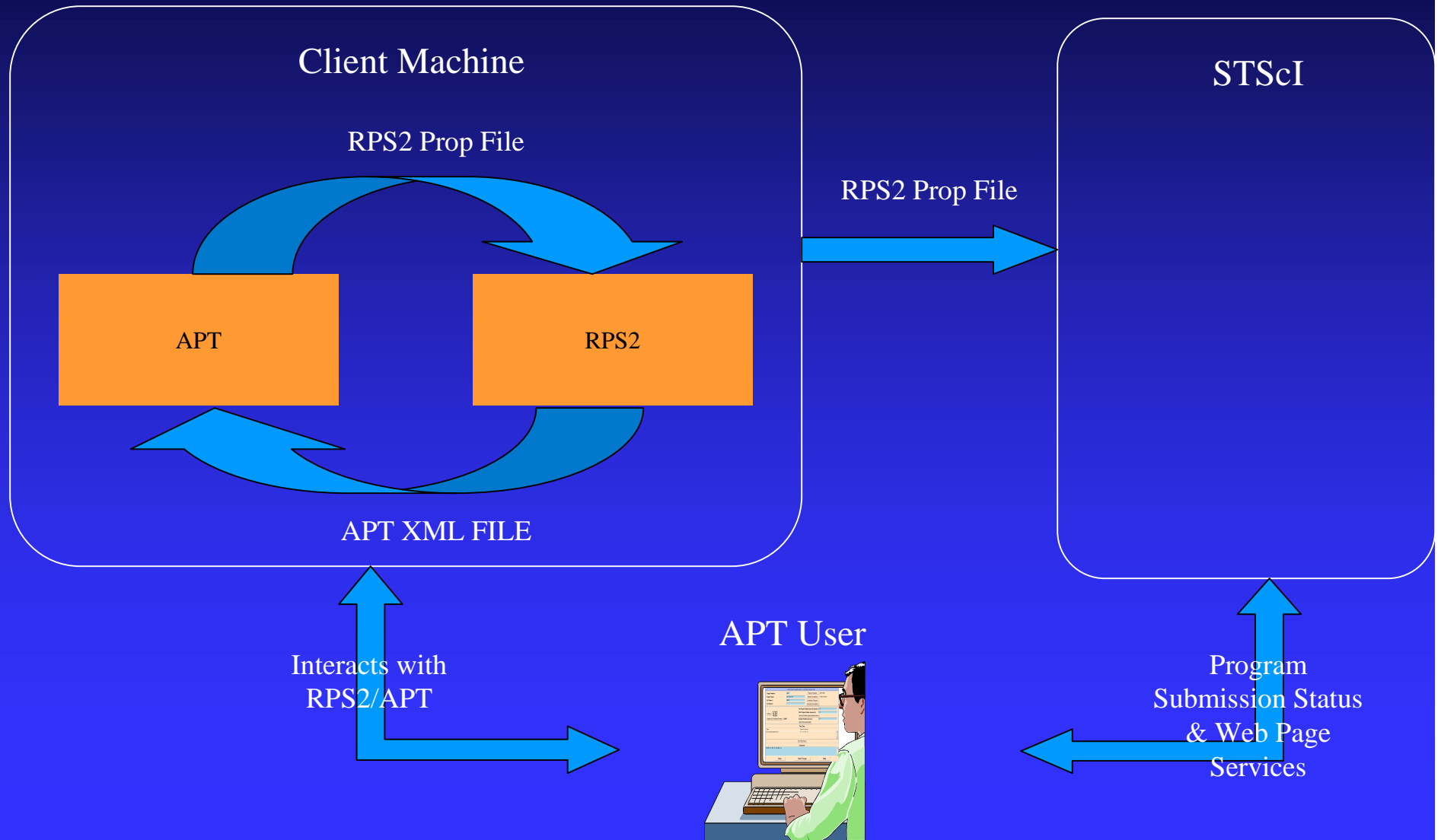
- Will support Moving Target's like RPS2 does today
- Working Group starting in Summer 2001 to look at feasibility of adding capabilities.

APT Architecture

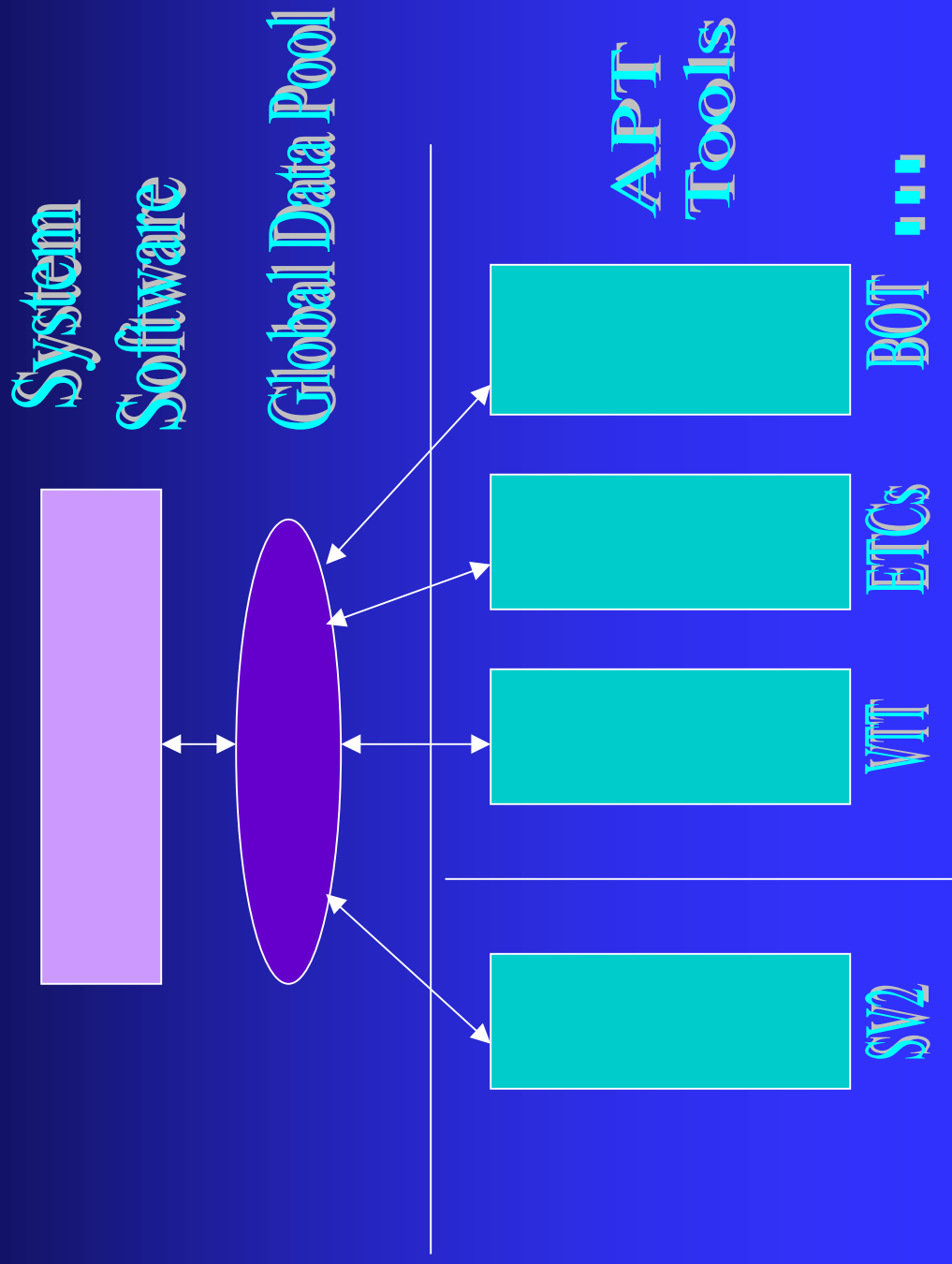
Architecture Major Requirements

- ❖ Support APT/RPS2 interprocess communication
- ❖ Support Interprocess Communication
 - STScI Legacy Systems
 - Web Servers
 - Archive/Catalog access
 - Database access
- ❖ Make tools easy to plug-in and inter-operate
- ❖ Keep Data Model separate from GUI and Control
- ❖ Support Synchronous & Asynchronous Tool Communication

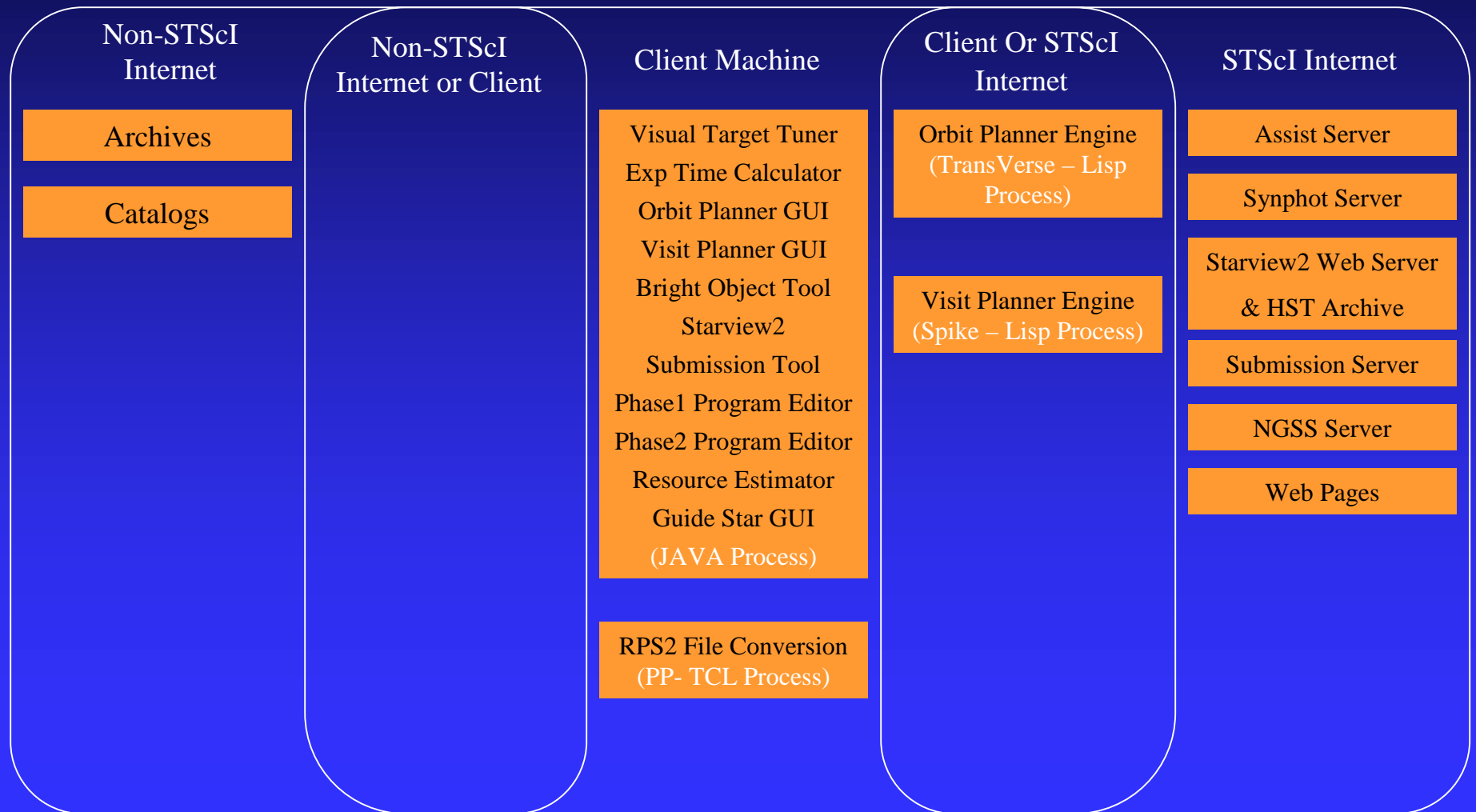
APT/RPS2 Communication



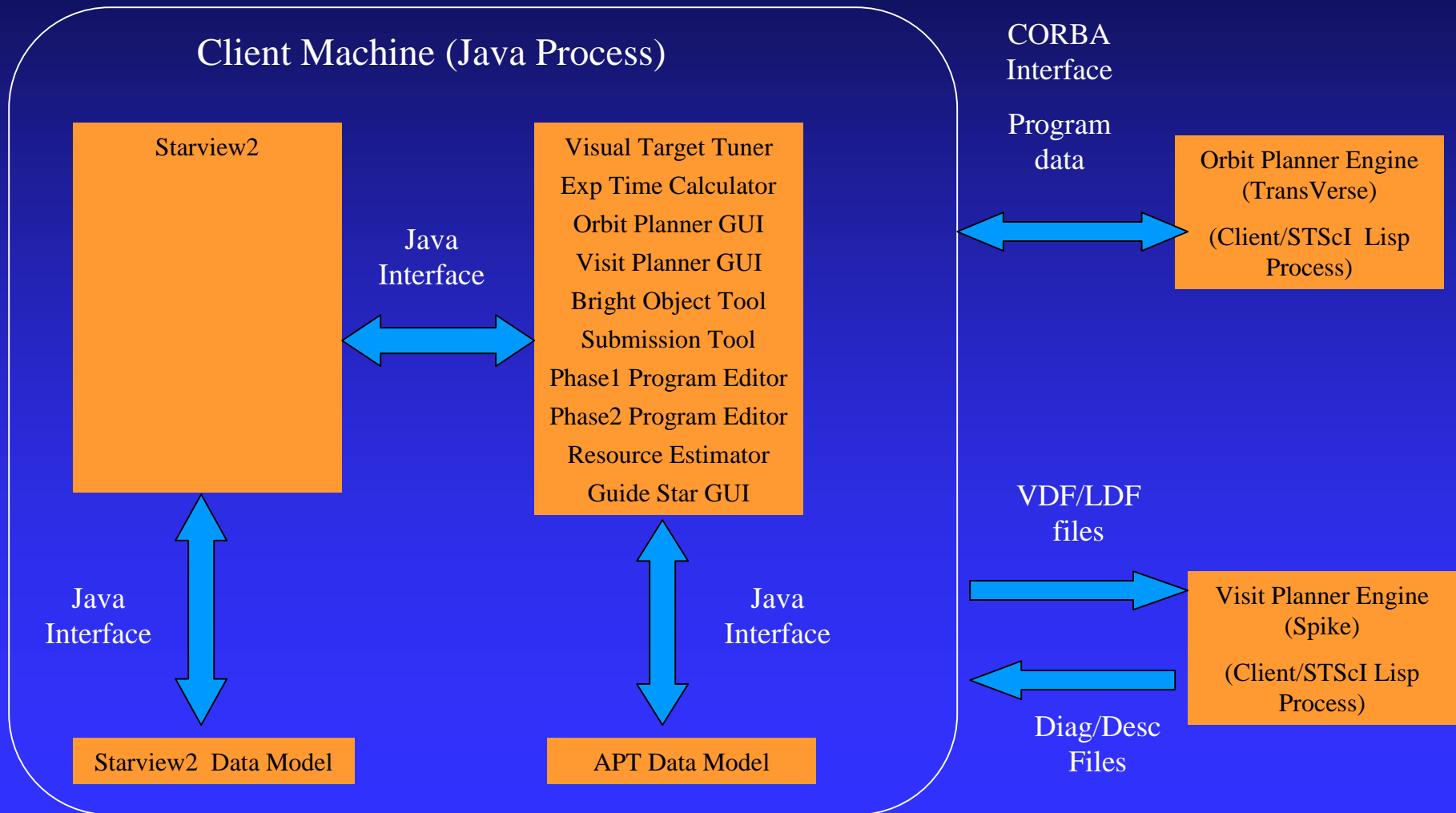
APT Architecture



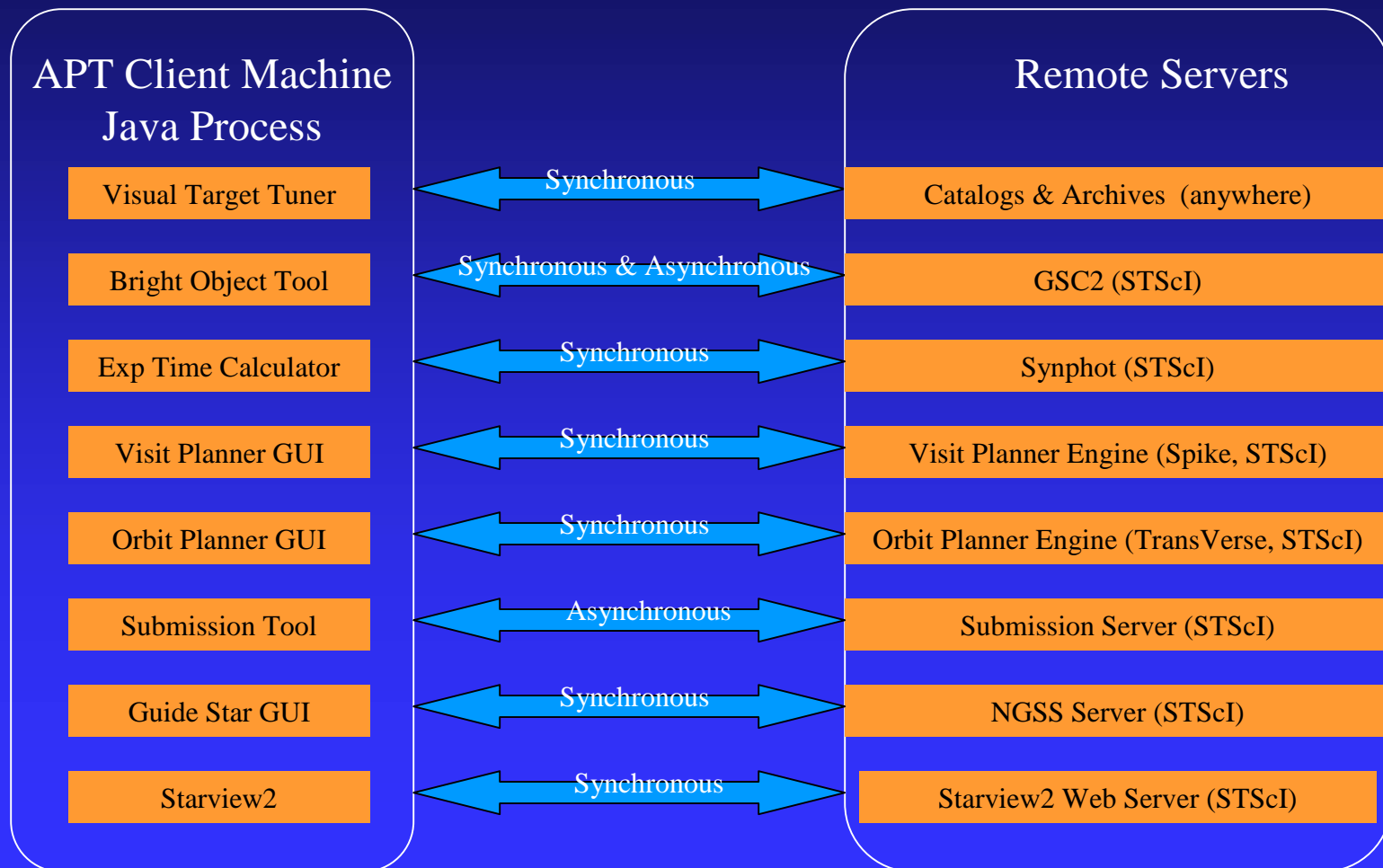
APT Processes



APT Client Side Interfaces



APT Client/Remote Interfaces



Data Model Separate from Control/GUI

- ❖ Uses the MVC design pattern
- ❖ Controller/Viewer are combined in the GUI “Modules”
- ❖ Data model is a collection of ScienceObjects
- ❖ Communication of changes to the data model are handled by Events & Listeners

Controller/Viewer Elements

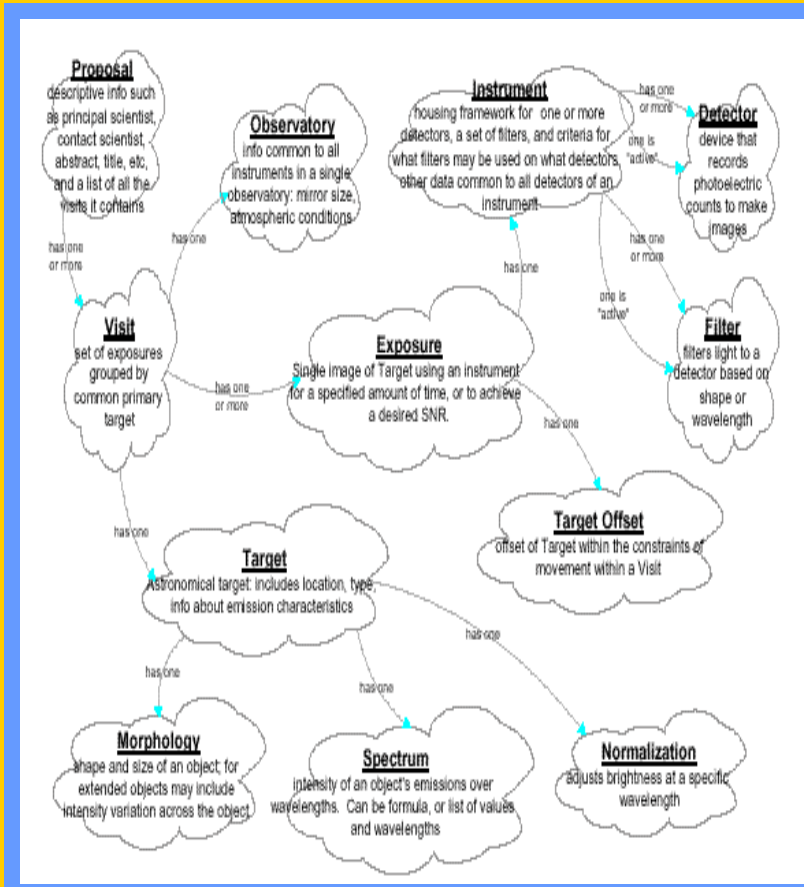
- ❖ Frames
- ❖ Modules
- ❖ Canvases
- ❖ Other standard extensions to the Java Swing Toolkit

GUI Modules

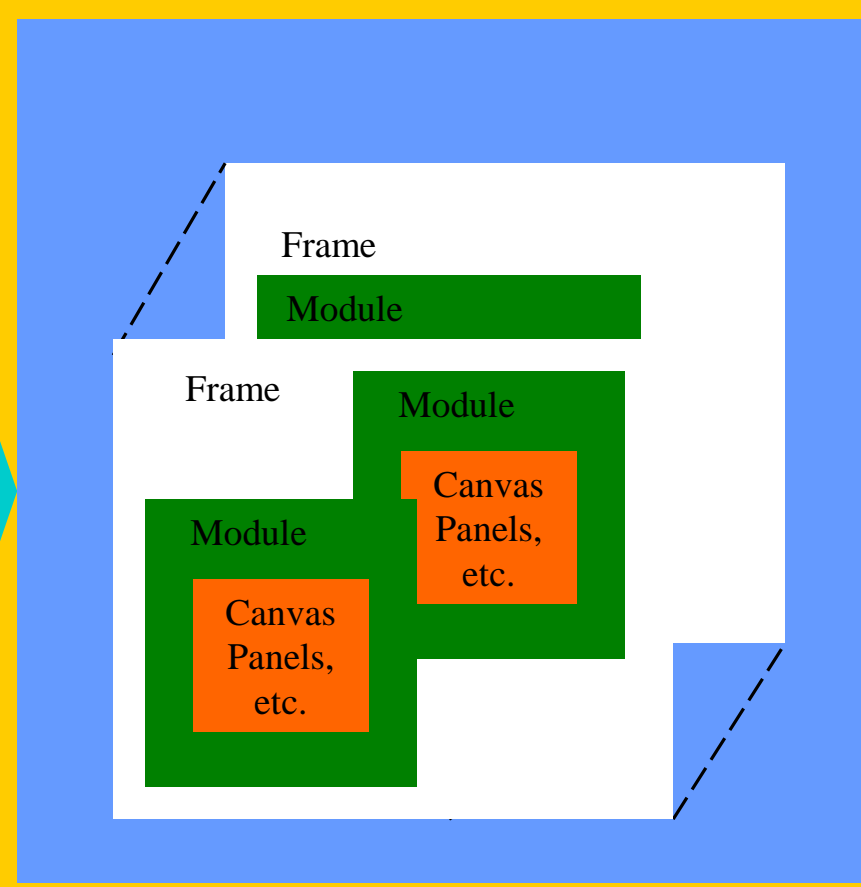
- ❖ A self-contained "Tool"
- ❖ Knows what displays to use
 - Individual GUI for each module
 - Same look & feel from common parent classes
- ❖ Examples
 - Exposure Time Calculator
 - Visual Target Tuner

APT MVC Model

Data Model

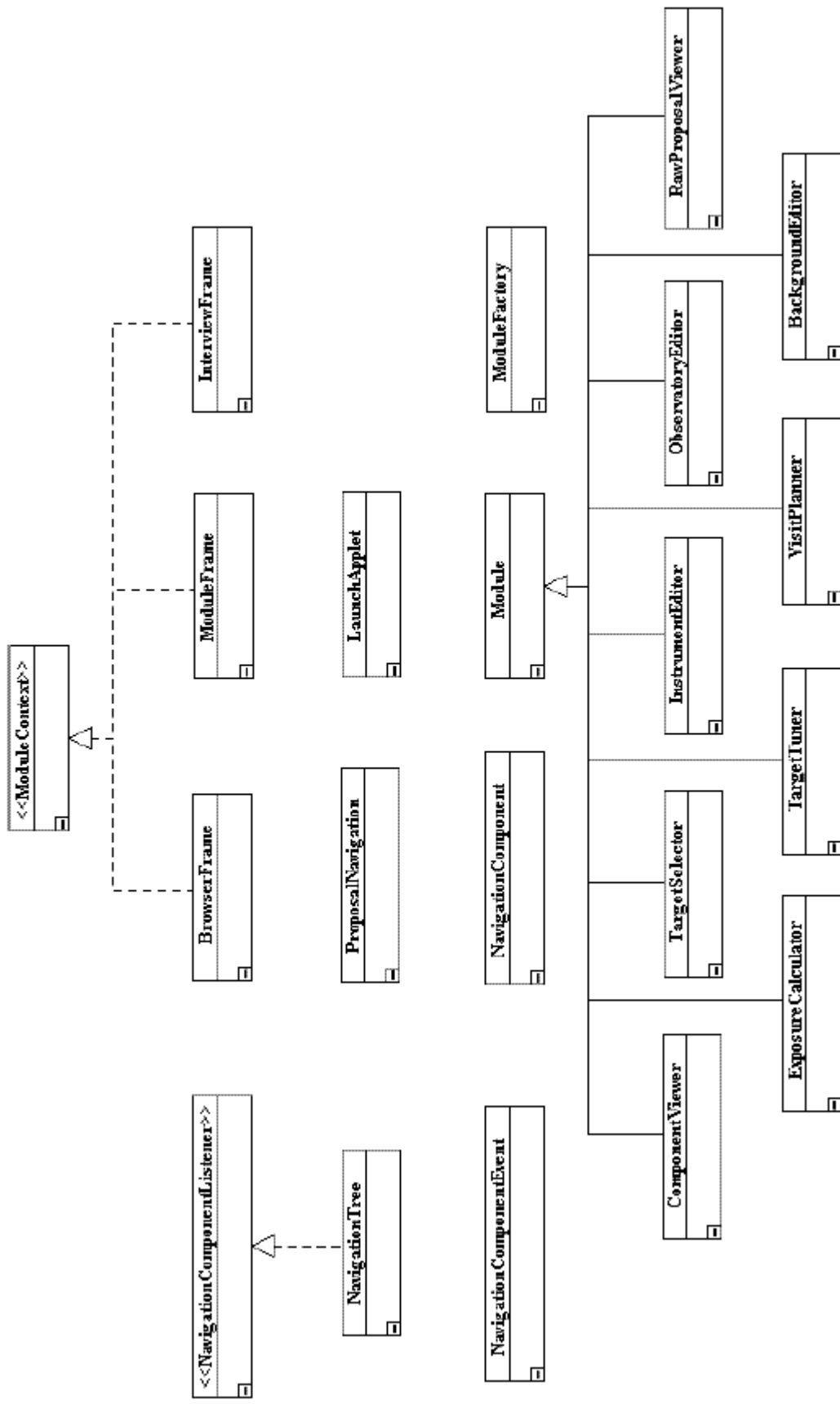


GUI/Control



Events & Listeners

APT GUI Class Hierarchy



GUI & Architecture Plans

- ❖ Cycle 11 Phase 2
 - Initial version of Top Level GUI & Architecture
 - Support Phase 2 processing w/o
 - ❖ Submission
 - ❖ Batch Processing
 - ❖ Guide Star support
- ❖ Cycle 12 Phase 2
 - Submission support
 - Batch Processing
 - Top Level GUI and Architecture Enhancements
 - PC Platform support

APT Review Plans

- ❖ Every 6 months (June, January) project status review from science perspective.
- ❖ Initial APT reviews are larger scope, like yesterday and today.
- ❖ Next Technical Reviews
 - APT Help April 2001
 - APT Visit Planner April 2001
- ❖ After initial reviews
 - requirements are developed and reviewed by the tool requirement teams.
 - Designs are reviewed at the apt project meeting.
 - Join apt-interested if you would like be on the mailings for these lesser reviews.

Additional Information

- ❖ See <http://ra.stsci.edu/apst/apt> for project information