Usability Enhancements for STK 9

THE STK EVOLUTION

From communications and coverage analysis, to highly accurate maneuver design, to real-time 3D visualization, STK offers users the ability to perform an uncountable number of tasks. But do you know where to look to find the right button, text field, or menu that you need? And if you do find it, does it allow you to solve your problem in a way that is intuitive and understandable?

These are some of the biggest challenges the product team faces in the STK product line. STK was born as an engineering tool meant for analysis tasks. As our user base has expanded, so have the types of tasks STK needs to address.

Back in 1989, STK 1.0 had a 2D map, vehicles, and targets. You did everything from one window. In 2008, STK 9 will support dozens of unique object types and allow for extensive configuration through thousands of interface panels, each with dozens of options. All of these panels, buttons, and toolbars were added to make whatever problem our users are trying to solve easier. While we have expanded capability, we also have increased our complexity. So with STK 9, we are elevating the accessibility of STK’s common functions in the user interface.

We reviewed our feature and bug tracking system for common themes, spoke with customers, and looked internally to determine what areas of STK would benefit most from a usability review. We decided that we would focus on the most common areas that any user would encounter when evaluating and learning STK:

- Adding objects
- “Access” and other analysis workflows
- Object properties and toolbars
- Reports and graphs
- Globe building

We realize there are many aspects of STK that are “rocket science” and the logic and understanding of those areas, regardless of the user interface or workflow, are incredibly sophisticated. But there is no reason why basic dynamic analysis and visualization can’t be understood and executed by all users within minutes.
Over the next few releases of our software, we plan to shift from a “create your data” paradigm, born from our design and analysis roots, to a “select your data” paradigm. For example, object databases, GPS constellation almanacs, Web-based geolocation services for ground stations, country selection for area analysis, and GIS data are all a small subset of options to create new objects in STK 9. Many of these features were available in previous versions, but they were spread throughout the user interface.

STK power users have no fear; despite some significant changes for STK 9, remote and integrated operations (Connect commands and STK Engine protocols) will remain the same.

THE NEXT WAVE: STK 9

ADDING NEW OBJECTS INTO YOUR SCENARIO

With 80+ toolbar buttons available, how does a new user know where to start? To tackle this problem, the process for populating a scenario has been completely redesigned for STK 9. Users will notice that all methods for creating or adding objects to STK will be available from one central tool versus previous versions of STK where the different methods were scattered about the interface. Just think, you can populate your entire scenario with one trip to the “new object” panel.

REPORT AND GRAPH USABILITY

A key component of any analysis is viewing and manipulating the output data. Reports and graphs along with the dynamic display and strip charts are being combined into a single output tool interface. This interface will allow users to report on any object or group of objects in a scenario without ever leaving the interface.

Users can create and store their favorite report styles for each object class or instance of an object and then rapidly access these styles from the Report Manager or the Object Manager via a context menu.

And just like the new one-stop shopping approach to the Access panel, users can even plot data from multiple objects in the same graph for comparison. In addition, the reports themselves now have interactive right-click context menus with items to set scenario animation time from report values and the ability to change the start, stop, and step times of the report, all from within the report window!

GLOBE BUILDING

All visualization starts with the globe. OK, we admit it, even though the 3D globe can help users understand their analysis, a lot of times we use it because it just looks so cool. With other 3D visualization options in the market, STK visualizations have come under closer review. So let’s take a quick look at what sets STK’s visualization apart:

• Supports both static and dynamic terrestrial and space vehicles.
• Moves forward and backward in time, or can slave to real time.
• Provides mechanism to visualize tens of thousands of objects.
• Views can be anywhere in the solar system, around any central body, in any reference system (e.g. sensor boreight view).
• Displays vectors, angles, axes, etc. to better understand geometric relationships.
• Serves as an input mechanism for defining object locations (e.g. defining aircraft route via mouse clicks).
• Manages and displays GIS data (terrain, imagery, vector data).

ANALYSIS WORKFLOWS

Using STK to solve analysis problems is typically a two-step process. First, configure your objects through the Object Browser and then perform your analysis in one of the many STK tools. This process is not always obvious to the new user. STK 9 addresses this concern in two ways.

First, right-click context menus and other drop-down menus have been streamlined so users can quickly find the right tool for the job. Second, analysis tools like Access and Coverage can now be accessed at any time (not necessarily tied to one specific object) and users can then select the objects to analyze from within that one analysis panel. Think of this as one-stop shopping for your Access analysis.

ORBIT WIZARD

An updated, interactive version of the orbit wizard will allow users to design and modify orbits with sliders and a 2D map preview capability. In general, the inclusion of more wizards within STK is being investigated. In this case, users can examine different orbit types (e.g. GEO, LEO, Sun-synchronous) from one simple interface. Not a bad place to start when designing a future constellation.

TOOLBARS AND PANELS

STK has options to set thousands of values. Where is that one button, that one text field, or that one toolbar that you need to control your analysis for the problem you are trying to solve? To help alleviate that problem, STK 9 moves the toolbars to the windows with which they are associated—2D options will be available right from the map window and 3D properties will be available from the globe window. All of the toolbars can float or be docked. Other areas of the workspace will also be more configurable than past versions of STK, including pinnable windows and the ability for users to create their own tools inside of the STK framework. Essentially, users now have better control of their screen’s workspace.

UI PLUGINS

OK, so we decided to throw a few things in there for the power users, such as the ability to create user interface (UI) plugins. The UI plugin architecture allows you to create custom toolbars, context menus, or dialog windows to add to the STK desktop application.

Want to write your own workflow or build a custom wizard for your users? Now you can... all inside of STK!

These components can be implemented in
any language that supports Microsoft COM and will appear as a seamless part of the STK application. Think HTML utilities on steroids!

**COMMUNICATIONS COMPONENT BROWSER**

Even if you’re not a comms person, this is good stuff. Previously, STK did not provide a built-in database to archive different standard payload types for future consumption. For example, there’s no direct way to model a specific civilian recreational 12-channel GPS receiver and have it readily available in all your scenarios as a template. Now, we have this mechanism in place for receivers, transmitters, antennas, bandwidth filters, etc. Model your communication payloads to specification just once, and then make them available in all of your scenarios. Thanks to our STK/Astrogator product for providing the baseline and inspiration for this architecture.

STK 9 will take even better advantage of fantastic imagery and terrain, using streaming Web services that are readily available on Web Map Services servers.

These are just a few STK 9 highlights. We really have done a significant scrub of all the common tasks to step up the user experience. So if you’re not already using STK for your land, sea, air, and space analysis, maybe 9 is your time.

Stay tuned for the release announcement this summer, and then join us at our 2008 AGI Users’ Conference in Chicago Oct. 7-9 for demonstrations, hands-on training, “under the hood” discussions, and much more.

Jimmy Tucholski is AGI’s director of STK software development, overseeing updates and custom enhancements to the STK product line. Jimmy holds two patents; one related to spacecraft drag and the other related to determining exposure of spacecraft-mounted solar panels to Sun. The latter is the basis for STK’s Solar Panel Tool.