

PROJECT DEFINITION

Develop a scenario/mission planning system that will aid program managers in planning their scenarios. The tool should be easy to use and greatly reduce the time it takes to create scenarios. It should aid in the coordination of assets and play a key role in rehearsing the mission.

Whenever the words “ease of use”, “easy to use”, “easily” or anything similar are used throughout this document, they mean that the minimal number of key strokes/mouse clicks are used to perform that function and that it can be done with minimal effort on the operator’s part. If a function can be done with one keystroke it should be done in that one. Menu headings should be descriptive of the contents. Any user with about one hour training should be able to operate the tool sufficiently. The whole thing should have an intuitive feel to it and the same methodology should be employed for doing similar kinds of things. A user should be able to get everything set up in no more than a couple of working days. Granted there will be modifications being made all the time, but the general setting up should not take too long.

GENERAL DISPLAY CAPABILITIES

Map of area of interest – what we want here is some map showing the Hawaiian Islands and surrounding areas. It should be able to look at least at our entire hemisphere with all pertinent land masses as we zoom out more and more land masses should appear. All items plotted on this map should be in the correct relative positions on the map and items at any given lat/long on this map should appear to be so regardless of altitude, in other words, if a missile is flying 400K feet in the air and it passes over a ship on the surface of the ocean, on the map, we expect to see both items in the same spot. We should be able to zoom and pan around the display with very little effort (maybe a mouse movement and a click or key stroke – use one hand) so that we can easily negotiate around the display in the “heat of battle” Maybe a sliding bar with a scale to zoom. PMRF will have the final say as to whether this is so. Has to have several different units of measure that user can go between on the fly (i.e yards, meters, nautical miles, statute miles, feet, etc). We want to be able to display a variety of overlays including but not limited to NTADS GOG files on the map. This should be as simple as popping up a list of choices and selecting items from that list to display them. We would like to be able to make drawings of scenarios on the map so this ability needs to be provided in the tool. Some of the items we would draw are lines, geometric shapes. We would also like to type in text strings and have them displayed where we want them. We want to move these drawings around the map both individually and as a group. The moving capability should be as easy as clicking on the item and dragging it to a new position with the mouse. We would also like to be able to click on an item and enter a lat/long position for it and have the object move so that is centered on that lat/long position. Once drawn we want to save these and display them on our other systems (NTADS, SIMDIS, Tsunami). The widget that has the map display should be sizeable like standard Windows type widgets with the map taking up most of the widget space. We don’t want it cluttered up with other widgets. We should be able to change colors of individual tracks, overlays and other objects using a standard popup color change widget. Ability to draw history trails with and without timing marks ability to draw trails and add timing marks – adjustable in seconds – also display text read outs at given intervals i.e. once a second, once a minute, etc. chosen by the user.

We want to enter reference locations given in lat/long – and be able to get range and bearing readings from that location. We would also like to anchor a range bearing vector to an object on the screen and be able to take multiple readings from it to other objects.

Have a general x vs y plotting tool where any available data parameters can be specified and plotted as needed. This is what we refer to as a strip chart, but instead of having set x, y parameters for the axis, we would like to assign them at run time. i. e. If I want time vs altitude or altitude vs distance or anything else, I would be able to do this at run time. Once its set up to our liking, we want to save the plot for later recall. We also want the ability to specify the units of measure for each axis. Maybe a pull down box for each axis with all possible parameters that we highlight to select from. And then another box to assign the units of measure.

The system should be able to display up to 8 of these plots at the same time on the same box along with the basic map. The tool should be written in such a way that it will run on any of our current platforms without bogging down under the above conditions and at any data rates.

The tool should run on any UNIX box. We don't want it to be able to run only on one brand of box with only one generation of operating system. If we need to update the hardware or the operating system, we expect the tool to run with no major modifications other than recompiling.

After such changes, we expect the tool to be ready for operation in at most 5 working days. Software should be backward and forward compatible.

We eventually would like it to run on NT boxes as well (laptops or desktops).

Vehicles should be displayed with different and appropriate symbols including the NTDS set. (i.e. aircraft, missiles, ships, etc.) The user should be able to turn the symbols on or off. When the symbol is off, a dot will represent the vehicle.

Allow for speed leaders to be attached to vehicles – this is a projection of where the track will be at a given time in the future given its current speed and heading. The user should be able to set the length of the leader in units of minutes or seconds.

Internal propagator (Kepler, integration of equations of motion) for propagating forward in time to specified condition.

The tool should have extensive on line help much like the help feature in the Satellite Tool Kit.

There are five basic phases that the scenario planner will be used in.

PREPLANNING

Entering information on sensors, targets, weapons, other players – characteristics of each that will be of use during the rehearsal phases. This should include the assignments of VIDs and SIDs.

This should not be a drudgery – it should be simple enough to do this that we can do it in about 8-24 man hours.

The data should be reusable in other operations so that the user doesn't have to keep entering the same data over and over again.

PLANNING

The tool has to aid the user in developing scenarios, including but not limited to the following:

The tool should be able to accept data nominal data files from customers and produce ASCII XYZ ECF coordinate data files on up to ten targets that can be APL certified

We want to be able to create our own scenarios using either way points, range and bearing from a given point or a combination of both. We would then want save these scenarios and use them on our other systems so they must in a compatible format to our current GOG files.

We will be importing GOG files created else where and displaying them. Once again, a list widget from which we can select and apply the appropriate files would be the ideal way for us to do this.

As part of this phase, we would like to display instrumentation coverage based on information input in the first phase. This would help the user in choosing the appropriate sensors.

We need a tool that will be able to coordinate launch times for a number of players based upon their need to arrive at a given point at a specified time. Given the performance characteristics previously entered the tool should give the user feedback as to the ideal time each vehicle should be launched in order to arrive at a given point on schedule. The tool should ideally do this for as many as 10 vehicles simultaneously.

REHEARSAL

Drive the rehearsal process for the scenarios developed by simulating the entire mission. Create iNet messages (Msg 25) that simulate real time data packets and send them on the iNet to all work stations.

Incorporate the PMRF VID/SID instrumentation plan which includes the generation and distribution of the vehicle and sensor identification tables. Going a step further, we envision the tool actually creating the VID and SID tables from the data previously entered in the preplanning phase.

Generate IIPs and export these to the iNet. We are currently doing this using the real time computers.

Coordinate the launch times for all the players given that each must be at a certain point at a given time.

Simulate launches and provide the ability to change the launch times of other vehicles during the simulation based on arrival time.

The tool should have a method for time syncing the various players – we are not entirely satisfied with the method used in the current tool – namely clicking on the individual segments to time sync.

Display range sensor status – easy to read display of each sensor and its status (on or off track). Provide a warning when a sensor's parameters are exceeded based on the specifications for that sensor, which were previously entered.

Warn when a vehicle exceeds its performance criteria – again based on the specifications entered in the preplanning phase.

Give some help in correcting the above problems – provide popups or some message that give some hints as to possible corrective actions to take.

Given various launch positions and /or aspect angles accurately project a vehicle's performance. Monitor vehicle positions with respect to each other both graphically and textually. (Include predicted time to PCA or target point).

REAL TIME OPERATION

Read real time data from the iNet and display the tracks accurately on the map. Update the positions in near real time.

The tool should be able to plot the real time track as well as the projected track so that users can get a quick look at how the actual performance is progressing when compared to the predicted.

As during the rehearsal, the tool should be able to monitor sensor status during real time operations and provide the user with a quick look readout of same.

We envision that the tool would generate the IIP continuously and feed that information to the iNet for use by other workstations.

The tool should be easy to use, and be responsive to the rapid changes that take place in a real time situation.

POST OPERATIONS

The ability to record all data needed for a complete play back.

Easily play back the operation from a given start time.

Ability to fast forward, rewind.

Ability to speed up or slow down the playback.

Once again ease of use is important. Refer to project definition for 'ease of use' definition.